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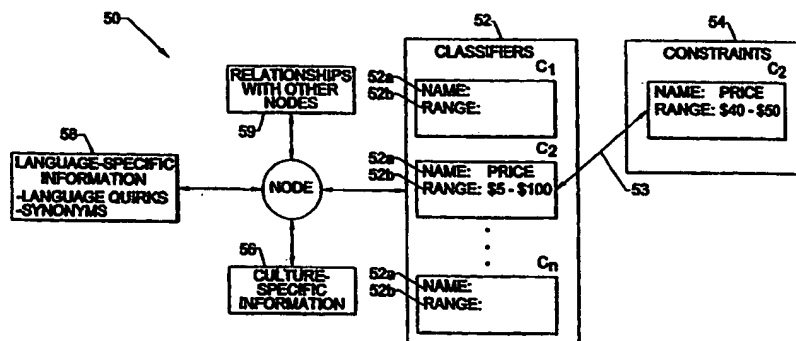
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(54) Title: SYSTEMS, METHODS AND COMPUTER PROGRAM PRODUCTS FOR PERFORMING MULTI-LINGUAL, MULTI-CULTURAL SEARCHES, COMPARISONS, AND PURCHASES OF PRODUCTS OFFERED FOR SALE AT MULTIPLE WEB SITES ON THE INTERNET



(57) Abstract: Systems, methods, and computer program products for performing multi-lingual, multi-cultural searches, comparisons, and purchases of products offered for sale at one or more Web sites on a computer network are provided. An intermediary Web site is configured to receive product search requests from users accessing the intermediary Web site via various types of client devices and via various languages. The intermediary Web site searches for nodes of a stored data structure that satisfy a received search request and sends results of the search to the requesting user. Search results may include lists of one or more products offered for sale at one or more of the Web sites that satisfy the received user request. A data structure is maintained by an intermediary and includes a plurality of nodes arranged in hierarchical order, wherein each node represents a respective category or sub-category of products offered for sale at one or more Web sites on a computer network. Each node may include language-specific information and culture-specific information associated therewith. Search results sent to requesting users may also include one or more user-manipulatable slider widgets that are configured to change the search results displayed within a user device display dynamically in real time in response to user manipulation.

WO 01/13273 A2

SYSTEMS, METHODS AND COMPUTER PROGRAM PRODUCTS FOR  
PERFORMING MULTI-LINGUAL, MULTI-CULTURAL SEARCHES,  
COMPARISONS, AND PURCHASES OF PRODUCTS OFFERED FOR  
SALE AT MULTIPLE WEB SITES ON THE INTERNET

#### Field of the Invention

The present invention relates generally to  
commerce and, more particularly, to electronic  
commerce conducted via computer networks.

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#### Related Applications

This application claims the benefit of  
U.S. Provisional Application No. 60/149,351, filed  
August 18, 1999.

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#### Background of the Invention

The Internet has gained broad recognition  
and acceptance as a viable medium for communicating  
and for conducting business. The World-Wide Web  
15 (Web) was created in the early 1990's, and is  
comprised of server-hosting computers (Web servers)  
connected to the Internet that have hypertext

documents (referred to as Web pages) stored therewithin. Web pages are accessible by client programs (e.g., Web browsers) utilizing the Hypertext Transfer Protocol (HTTP) via a  
5 Transmission Control Protocol/Internet Protocol (TCP/IP) connection between a client-hosting device and a server-hosting device.

Electronic commerce (e-commerce) refers to the buying and selling of products and services via  
10 the Web. Exemplary products include items (e.g., music) that are delivered electronically to the purchaser over the Internet and items (e.g., books) that are delivered through conventional distribution channels (e.g., a common carrier). Typically, when a  
15 user has selected one or more items to be purchased from an e-commerce Web site, a server computer system prompts the user for purchaser-specific information in order to complete the financial transaction. This purchaser-specific order  
20 information may include the purchaser's name, the purchaser's credit card number, and a shipping address for the order. The server computer system then typically confirms the order by sending a confirming Web page to the client computer system  
25 and schedules shipment of the items.

The sheer size of the Web may be an impediment to e-commerce, particularly for users trying to locate and compare products offered for sale at various Web sites. Moreover, product  
30 information may not be stored or presented in a consistent, homogenous format across the Web. For example, one traditional e-commerce approach referred to as "menu browsing" requires users to "drill down" through product listings to obtain

product information.

Figs. 1A-1D illustrate an exemplary menu browsing Web site that requires users to drill down through various levels of information. A user  
5 starting at the home page 10 of Fig. 1A, and desiring to locate a particular type of men's surfer shirt, clicks on the link labeled "Men's" 12. The Web page 14 of Fig. 1B is displayed in response to activation of the "Men's link 12 of Fig. 1A. The  
10 user must then click on the link labeled "Shirts & Polos" 16. The Web page 18 of Fig. 1C is displayed in response and contains a link for the desired surfer shirt. Upon clicking on the link labeled "Surfer Shirt" 20, the Web page 22 that displays  
15 information about the desired shirt is displayed (Fig. 1D).

Another traditional approach implemented by conventional e-commerce Web sites requires users to conduct keyword searches to locate products and  
20 product information. Fig. 2A illustrates a Web page 24 that displays an exemplary keyword search interface 26 for locating music. In the illustrated Web page 24, a user has entered search keywords for music composed by Beethoven and performed by the  
25 London Symphony Orchestra. Fig. 2B illustrates a Web page 28 that displays the results of the search keywords entered in the Web page 24 of Fig. 2A. As illustrated, the search located 135 items that satisfied the terms of the search.

30 Unfortunately, browsing long lists of search results (as illustrated in Fig. 2B) may be undesirable by many Web users. Another drawback associated with keyword searches is that results returned from keyword searches may be returned in

virtually any order. For example, items located in the illustrated search for music composed by Beethoven and performed by the London Symphony Orchestra (Figs. 2A and 2B) may be randomly  
5 displayed to the user. However, a user may find it desirable for the search results to be displayed in some order, such as by price or by date of performance.

Another drawback associated with keyword  
10 searches is that context associated with a search may be lost. For example, a search conducted using the keyword "bag" may return products related to bags of sugar, duffel bags, golf bags, tote bags, and the like. As a result, a user desiring to locate  
15 information on "hand bags" may be confronted with a large and unwieldy number of results to peruse after conducting a traditional keyword search of conventional e-commerce Web sites.

Furthermore, layouts and designs of Web  
20 sites may vary. For example, one Web site may allow a user to refine a keyword search by passing through different levels of a product hierarchy. Another Web site may require the use of a search engine to locate products. As such, users often have to learn  
25 how to best search for information at each individual Web site. As a result, searching for products over the Web may be difficult and inefficient.

According to recent studies, about 96% of  
30 all e-commerce Web sites utilize the English language, although only about 7 countries actually use English as a primary language. With the rapid growth of the Web, it is predicted that by the year 2003 65% of all Web users will come from countries

other than the United States. As such, it is anticipated that there will be rapid growth in Web sites using languages other than English. Unfortunately, from an e-commerce standpoint, it may be difficult to search for and compare products offered for sale at Web sites using different languages. For example, it may be difficult for a person fluent only in English to search for and compare products from Web sites in non-English languages.

#### Summary of the Invention

In view of the above discussion, the present invention provides systems, methods, and computer program products for locating products offered for sale at one or more Web sites on a computer network. According to an embodiment of the present invention, a Web site of an intermediary is utilized for performing multi-lingual, multi-cultural searches, comparisons, and purchases of products offered from sale at a plurality of Web sites on a computer network, such as the Internet. The intermediary Web site is configured to receive product search requests from users accessing the intermediary Web site via various types of client devices and using various languages. The intermediary Web site searches the nodes of a stored data structure for products that satisfy a received search request and sends results of the search to the requesting user. Search results may include lists of one or more products offered for sale at one or more of the Web sites that satisfy the received user request.

A data structure according to an

embodiment of the present invention is maintained by an intermediary and includes a plurality of nodes arranged in hierarchical order, wherein each node represents a respective category or sub-category of products offered for sale at one or more Web sites on a computer network. At least one classifier is associated with one or more of the nodes. Each classifier includes a name of an attribute of a product category or sub-category and a range of values associated with a respective attribute. Each classifier associated with a node that is a child node of a parent node inherits attribute names and value ranges from one or more classifiers associated with the parent node.

Each node may include language-specific information associated therewith, wherein the language-specific information includes information about a product category or subcategory relative to one or more human languages. Also, each node may include culture-specific information associated with a node, wherein the culture-specific information comprises information about a product category or sub-category relative to one or more human cultures. For example, the term "football" to Americans may mean something different than the term "football" to Europeans.

Search results sent to requesting users may also include one or more user-manipulatable slider widgets. Slider widgets according to embodiments of the present invention are configured to change the search results displayed within a user device display dynamically in real time in response to user manipulation. For example, a slider widget may be configured to allow a user to change

displayed results based upon sales price of products in a list. Slider widgets according to embodiments of the present invention may allow users to instantly refine and redirect searches, even in multiple languages.

According to another embodiment of the present invention, an intermediary Web site is configured to execute transactions with individual Web sites on behalf of a user and without requiring a user to communicate with the individual Web sites.

According to another embodiment of the present invention, an intermediary Web site is configured to retrieve information about one or more products offered for sale at multiple Web sites on a computer network. A Web site on a computer network from which product information is to be extracted is initially selected. A node from a data structure is selected and a search request that includes various information from the selected node is created. The selected Web site is then searched for products offered for sale that satisfy the search request. Information about each product for sale at the selected Web site that satisfies the search request is retrieved and stored.

According to other embodiments of the present invention, retrieved information associated with each product that satisfies a search request may be assigned a display priority that determines a priority in which information about a product is displayed to a user.

Embodiments of the present invention allow users to search, compare and purchase merchandise across multiple languages. Moreover, embodiments of the present invention allow side-by-side



product/price comparisons on single screen. In addition, purchase transactions from multiple Web sites can be simplified via a unified check-out procedure according to embodiments of the present invention.

As such, embodiments of the present invention may overcome many of the limitations of conventional e-commerce Web sites that require shoppers to search for available products via keywords and to the peruse long lists of search results. Moreover, embodiments of the present invention may provide an advantageous alternative to the rigid model of navigation utilized by many conventional Web sites wherein shoppers are required to drill down through multiple layers of Web pages. The present invention may also facilitate aggregating search results into a format easier to use by shoppers.

#### Brief Description of the Drawings

**Figs. 1A-1D** illustrate a conventional e-commerce Web site utilizing menu browsing and that requires users to drill down through various levels of Web pages and information.

**Fig. 2A** illustrates a Web page from a conventional e-commerce Web site that displays an exemplary keyword search interface for locating music.

**Fig. 2B** illustrates a Web page from the e-commerce Web site of **Fig. 2A** that displays the results of the search keywords entered in the Web page of **Fig. 2A**.

**Fig. 3** is a block diagram that illustrates a Web site of an intermediary for performing multi-

lingual, multi-cultural searches, comparisons, and purchases of products offered from sale at a plurality of Web sites on a computer network, according to embodiments of the present invention.

5           Fig. 4 is a block diagram that illustrates an exemplary node from a data structure according to embodiments of the present invention.

          Fig. 5 is a block diagram that illustrates a parent node and a child node related thereto, according to an embodiment of the present invention.

10

          Fig. 6 is a block diagram that illustrates a data structure having a plurality of nodes in hierarchical order wherein each node represents a respective category or sub-category of products offered for sale at one or more Web sites on a computer network, according to an embodiment of the present invention.

15

          Fig. 7 is a flow chart illustrating operations for retrieving information about one or more products offered for sale at Web sites on a computer network, according to embodiments of the present invention.

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          Fig. 8 is a block diagram that illustrates the structure of three tables of a database for storing data structures according to embodiments of the present invention.

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          Fig. 9 is a flow chart illustrating operations for locating and purchasing products offered for sale at one or more Web sites on a computer network, according to embodiments of the present invention.

30

          Fig. 10 is a user interface containing search results from a user request to an intermediary Web site and also containing a

plurality of slider widgets for dynamically modifying the search results, according to an embodiment of the present invention.

5 Fig. 11 is a user interface according to an embodiment of the present invention through which a user can enter a product search for products offered for sale by Web sites on a computer network.

10 Fig. 12 is a user interface containing search results from a search initiated in the user interface of Fig. 11, according to an embodiment of the present invention.

15 Fig. 13 is a user interface that displays products for sale by various Web sites that were selected by a user in accordance with the present invention, and through which the user can direct the intermediary to complete purchasing transactions with the various Web sites on behalf of the user.

#### Detailed Description of the Invention

20 The present invention now is described more fully hereinafter with reference to the accompanying drawings, in which preferred embodiments of the invention are shown. This invention may, however, be embodied in many  
25 different forms and should not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided so that this disclosure will be thorough and complete, and will fully convey the scope of the invention to those  
30 skilled in the art.

As will be appreciated by one of skill in the art, the present invention may be embodied as methods, data processing systems, and/or computer program products. Accordingly, the present invention

may take the form of an entirely hardware embodiment, an entirely software embodiment or an embodiment combining software and hardware aspects. Furthermore, the present invention may take the form of a computer program product on a computer-usable storage medium having computer-usable program code embodied in the medium. Any suitable computer readable medium may be utilized including hard disks, CD-ROMs, optical storage devices, or magnetic storage devices.

Computer program code for carrying out operations of the present invention may be written in an object oriented programming language such as JAVA®, Smalltalk or C++. The computer program code for carrying out operations of the present invention may also be written in conventional procedural programming languages, such as "C", JavaScript, Visual Basic, TSQL, Perl, or in various other programming languages. Software embodiments of the present invention do not depend on implementation with a particular programming language. Portions of the program code may execute entirely on one or more data processing systems utilized by an intermediary Web site.

Program code for carrying out aspects of the present invention may execute entirely on one or more servers, or it may execute partly on a server and partly on a client within a client device (i.e., a user's Web client), or as a proxy server at an intermediate point in a communications network. In the latter scenario, a client device may be connected to a server through a LAN or a WAN (e.g., an intranet), or the connection may be made through the Internet (e.g., via an Internet Service

Provider). It is understood that the present invention is not TCP/IP-specific or Internet-specific. The present invention may be embodied using various protocols over various types of computer networks.

The present invention is described below with reference to block diagrams and/or flowchart illustrations of methods, apparatus (systems) and computer program products according to embodiments of the invention. It is understood that each block of the block diagrams and/or flowchart illustrations, and combinations of blocks in the block diagrams and/or flowchart illustrations, can be implemented by computer program instructions.

These computer program instructions may be provided to a processor of a general purpose computer, special purpose computer, or other programmable data processing apparatus to produce a machine, such that the instructions, which execute via the processor of the computer or other programmable data processing apparatus, create means for implementing the functions specified in the block diagrams and/or flowchart block or blocks.

These computer program instructions may also be stored in a computer-readable memory that can direct a computer or other programmable data processing apparatus to function in a particular manner, such that the instructions stored in the computer-readable memory produce an article of manufacture including instruction means which implement the function specified in the block diagrams and/or flowchart block or blocks.

The computer program instructions may also be loaded onto a computer or other programmable data

processing apparatus to cause a series of operational steps to be performed on the computer or other programmable apparatus to produce a computer implemented process such that the instructions which  
5 execute on the computer or other programmable apparatus provide steps for implementing the functions specified in the block diagrams and/or flowchart block or blocks.

A Web site is conventionally a related  
10 collection of Web files that includes a beginning file called a "home" page. From the home page, a visitor can access other files and applications at the Web site. A large Web site may utilize a number of servers, which may or may not be different and  
15 may or may not be geographically-dispersed. For example, the Web site of the International Business Machines Corporation ([www.ibm.com](http://www.ibm.com)) consists of thousands of Web pages and files spread out over multiple Web servers in locations world-wide.

A Web server (also referred to as an HTTP  
20 server) is a computer program that utilizes HTTP to serve files that form Web pages to Web clients. Exemplary Web servers are International Business Machines Corporation's family of Lotus Domino®  
25 servers, the Apache server (available from [www.apache.org](http://www.apache.org)), and Microsoft's Internet Information Server (IIS), available from Microsoft Corporation, Redmond, Washington.

A Web client is a requesting program that  
30 also utilizes HTTP. A browser is an exemplary Web client for use in requesting Web pages and files from Web servers. A Web server waits for a Web client, such as a browser, to open a connection and

to request a specific Web page or application. The Web server then sends a copy of the requested item to the Web client, closes the connection with the Web client, and waits for the next connection.

5 HTTP allows a browser to request a specific item, which a Web server then returns and the browser renders. To ensure that browsers and Web servers can interoperate unambiguously, HTTP defines the exact format of requests (HTTP requests) sent  
10 from a browser to a Web server as well as the format of responses (HTTP responses) that the Web server returns to the browser. Exemplary browsers include Netscape Navigator® (America Online, Inc., Dulles, VA) and Internet Explorer® (Microsoft Corporation,  
15 Redmond, WA). Browsers typically provide a graphical user interface for retrieving and viewing Web pages, applications, and other resources served by Web servers.

As is known to those skilled in this art,  
20 a Web page is conventionally formatted via a standard page description language such as HyperText Markup Language (HTML), which typically contains text and can reference graphics, sound, animation, and video data. HTML provides for basic document  
25 formatting and allows a Web content provider to specify anchors or hypertext links (typically manifested as highlighted text) to other servers. When a user selects (i.e., activates) a particular hypertext link, a browser running on the user's  
30 client device reads and interprets an address, called a Uniform Resource Locator (URL) associated with the hypertext link, connects the browser with a Web server at that address, and makes a request (e.g., an HTTP request) for the file identified in

the hypertext link. The Web server then sends the requested file to the client device which the browser interprets and renders within a display screen.

5                   Referring now to Fig. 3, a Web site 30 of an intermediary for use in performing multi-lingual, multi-cultural searches, comparisons, and purchases of products offered from sale at a plurality of Web sites 32 on a computer network 34, such as the  
10   Internet, according to embodiments of the present invention, is illustrated. The illustrated intermediary Web site 30 is configured to receive product search requests from users (e.g., subscribers and/or visitors) accessing the  
15   intermediary Web site via various types of client devices 36. The intermediary Web site 30 searches the nodes of a stored data structure for products that satisfy a received search request and sends results of the search to the requesting user. Search  
20   results may include lists of one or more products offered for sale at one or more of the Web sites that satisfy the received user request.

                  The illustrated intermediary Web site 30 includes a Web server 40 and a database 42. Although  
25   a single Web server 40 and a single database 42 are illustrated, it is understood that multiple Web servers and/or multiple databases may be utilized to perform the various functions of the intermediary Web site 30. Moreover, the functionality of the Web  
30   server 40 and the database 42 may be integrated together.

                  The Web server 40 is the "front end" component of the intermediary Web site 30 and is configured to receive various requests from users



accessing the intermediary Web site 30 and to serve responses to these requests. Moreover, utilizing one or more application programs 44, the Web server 40 is configured to gather information about products offered for sale at each of a plurality of Web sites 32, and store this information within a data structure maintained by the database 42.

Exemplary Web servers that may be utilized as a Web server 40 by the illustrated intermediary Web site 30 include, but are not limited to, Apache, available from the Apache Server Project ([www.apache.org](http://www.apache.org)); Microsoft's Internet Information Server (IIS), available from Microsoft Corporation, Redmond, Washington; and Netscape's FastTrack® and Enterprise™ servers, available from America Online, Inc., Dulles, Virginia. Other Web servers that may be utilized include Novell's Web Server for users of its NetWare® operating system, available from Novell, Inc., San Jose, California; and IBM's family of Lotus Domino® servers, available from International Business Machines Corporation, Armonk, New York.

As is known by those of skill in the art, a database is a collection of data that is organized in some format (e.g., "tables"). A database typically includes a database manager that facilitates accessing, managing, and updating data within the various tables of a database. Exemplary types of databases that can be utilized to perform the various functions of the illustrated database 42, according to the present invention, include relational databases, distributed databases (databases that are dispersed or replicated among different points in a network), and object-oriented

databases. Relational, distributed, and object-oriented databases are well understood by those of skill in the art and need not be discussed further herein. Exemplary databases that can be utilized to perform the various functions of the illustrated database 42 include, but are not limited to, IBM's DB2® database, Microsoft's SQL server database, and database products from Oracle, Sybase, and Computer Associates.

10                   A database server (not illustrated) may be utilized to serve as a "middleman" server between the Web server 40 and the database 42. As is known to those of skill in the art, a database server includes program code and logic for retrieving data from databases (and from sources external to a Web site) in response to requests from a Web server. Exemplary database servers that may be utilized as a database server by the illustrated intermediary Web site 30 include, but are not limited to, Microsoft's SQL server, IBM DB2® Universal Database server, and the WebSphere™ Net.Commerce server, the latter two being available from International Business Machines Corporation, Armonk, New York.

25                   The illustrated intermediary Web site 30 is configured to communicate with users accessing the intermediary Web site 30 via a client program, such as a browser, running on a client device 36. These users may include subscribers that are registered with the intermediary and non-subscribing visitors. Exemplary client devices executing a browser include, but are not limited to, personal computers, wireless communications devices, personal digital assistants (PDAs), hand-held computers, Internet-ready phones, and WebTVs. As illustrated in

Fig. 3, browsers running on various client devices 36 of subscribers and visitors may communicate with the Web server 40 of the intermediary Web site 30 via a communications network 34, such as the Internet. However, it is understood that the present invention may be implemented across a private computer network such as an intranet.

A data structure is stored within the database 42. A data structure according to an embodiment of the present invention includes a plurality of nodes arranged in hierarchical order, wherein each node represents a respective category or sub-category of products offered for sale at one or more Web sites 32 on a computer network 34. At least one classifier is associated with one or more of the nodes. Each classifier includes a name of an attribute of a product category or sub-category and a range of values associated with a respective attribute. Each classifier associated with a node that is a child node of a parent node inherits attribute names and value ranges from one or more classifiers associated with the parent node.

Each node may include language-specific information associated therewith, wherein the language-specific information includes information about a product category or subcategory relative to one or more human languages. Also, each node may include culture-specific information associated with a node, wherein the culture-specific information comprises information about a product category or sub-category relative to one or more human cultures. Data structures according to embodiments of the present invention are described in greater detail below.

According to embodiments of the present invention, the Web server 40 performs various functions. For example, the Web server 40, utilizing one or more content acquisition application programs 44a, selects a Web site 32 and selects a node from the stored data structure. A search request that comprises names and value ranges from classifiers associated with the selected node is created, the selected Web site 32 is searched for products offered for sale that satisfy the search request, and information about each product for sale at the selected Web site 32 that satisfies the search request is retrieved and stored in the database 42.

The Web server 40, utilizing one or more data retrieval application programs 44b, is also configured to receive a product search request from a user, to search nodes of the data structure in the database 42 for products that satisfy the received search request, and to send results of the search to the requesting user in a format displayable within a user device display. A user-manipulatable slider widget may also be sent with the search results that is configured to change the search results displayed dynamically in real time in response to user manipulation of the slider widget.

The Web server 40, utilizing one or more Web site transaction application programs 44c, is also configured to purchase products selected by users from multiple Web sites 32. For example, upon receiving a product purchase request from a user to purchase a first product from a first Web site and a second product from a second Web site, the Web server, using one or more purchasing transaction application programs, executes a transaction with

the first and second Web sites on behalf of the user and without requiring the user to communicate with the first and second Web sites. The Web server 40 then sends results of the executed transactions with the first and second Web sites to the user.

An exemplary type of application program that may be used by the Web server 40 in performing various ones of the above-described functions (content acquisition, data retrieval and storage, purchasing transactions) is a Common Gateway Interface (CGI) application program. As is understood by those of skill in the art, CGI is a standard that allows clients to interface with various application programs via Web servers. A Web server processes a client CGI request using a CGI script or application program. For example, when a database is queried by a client, a Web server acts as a gateway between the database and the client. The Web server transmits the client request to a CGI application program that performs the database query, formats the results and returns HTML-formatted data to the Web server. The Web server then transmits the HTML-formatted data to the client for display to the user.

It is understood that the present invention is not limited to the use of CGI application programs. For example, Microsoft Active Server Pages (ASP) technology and Java Server Pages (JSP) technology may be utilized to perform various ones of the above described functions and to retrieve and transmit information from and to client devices 36 and Web sites 32 in accordance with embodiments of the present invention.

It is also understood that the present

invention may be implemented using a standalone workstation, personal computer, and/or mainframe computer.

5

### Data Structure

Embodiments of the present invention dynamically cluster results from user searches for products offered for sale at various Web sites based on a product hierarchy created and maintained by an intermediary. The present invention distributes products in search results to different product families depending on descriptions of the products. Clustering based on product family generates clusters that may be more intuitive than traditional e-commerce approaches wherein products located in search results are clustered on the basis of certain predefined keywords that are common to all kinds of products. Category-specific clustering according to the present invention utilizes a data structure (also referred to as an "ontology") and various data retrieval application programs 44b that utilize information in the data structure to hierarchically cluster products located in search results.

A data structure according to an embodiment of the present invention includes a plurality of nodes arranged hierarchically. Each node in a data structure according to the present invention represents a category or sub-category of products offered for sale at one or more Web sites on a computer network, such as the Internet.

An exemplary node 50 of a data structure according to embodiments of the present invention is illustrated in Fig. 4. The illustrated node 50 includes one or more "classifiers", collectively

indicated as 52 and individually as  $C_1, C_2 \dots C_n$ . Each classifier 52 includes a name 52a of an attribute of a product category and a range of values 52b associated with the respective product category attribute. An exemplary classifier of a product offered for sale is "price" and is illustrated in Fig. 4 as  $C_2$ . The name 52a of the attribute  $C_2$  is "price" and the range 52b of values is the price range of the product offered for sale.

A node 50 may also have one or more "constraints", indicated as 54 in Fig. 4. A constraint 54 is associated with a particular classifier 52 of a node 50 and reduces or modifies the range of values of the classifier 52. The illustrated constraint 54 of Fig. 4 is associated with the classifier  $C_2$  as indicated by link 53. The illustrated constraint 54 reduces the range of values of the classifier  $C_2$  from \$5-\$100 to \$40-\$50 for node 50. It is understood that a node according to the present invention may have any number of constraints associated with respective classifiers of the node.

A node 50 may also have culture-specific information 56 and language-specific information 58 associated therewith, as illustrated. Culture-specific information 56 may include information about a product category (or sub-category) represented by a node relative to one or more human cultures. Language-specific information 58 may include information about a product category (or sub-category) represented by a node relative to one or more human languages.

Culture-specific information associated with a node may allow a category (or sub-category)

of products represented by a node to be displayed to users that access a data structure from one or more domains associated with one or more particular cultures. As is known to those of skill in the art, the term "domain", as used with respect to the Internet, refers to a set of network addresses organized in levels. The top level of a domain identifies geographic or purpose commonality (for example, the nation that the domain covers or a category such as "commercial"). For example, www.earthlink.de identifies a set of network addresses in Germany. As an example of culture-specific information associated with a node in accordance with the present invention, a product category, such as "German Pottery" may be limited to searching by users having a German domain (i.e., a top level domain name of ".de").

As another example of culture-specific information, the term "football" to Americans may mean something different than the term "football" to Europeans. Accordingly, a node associated with American football helmets may be limited to access by domains within the United States, for example.

Language-specific information 58 associated with a node includes natural language information, multi-lingual synonyms, and other language-oriented information. For example, the product category (or sub-category) "Hats" represented by a node may include English synonyms for the word "hat" (e.g., caps, berets, bonnets, visors), as well as synonyms from other languages (e.g., chapeau, cappello, berretto, sombrero, hoed).

In addition to language-oriented synonyms,



context-oriented synonyms may also be associated with a node. For example, the term "router" may refer to a power tool used by carpenters, and may refer to a device used in a computer network to control the routes of packets transmitted through the network. As such, a node for the product category (or sub-category) "routers" may include information indicating which type of device is represented by the particular node.

10               Natural language information may include rules regarding specific "quirks" of particular languages. For example, word order in some languages may be important. As such, a node may include one or more rules that facilitate maintaining proper word order in user searches and in search results. As  
15               another example, some languages associate "gender" (e.g., masculine, feminine) with words. As such, a node may include one or more rules that help maintain proper usage of gender in user searches and  
20               in search results.

              A node 50 in a data structure according to the present invention may also have one or more relationships 59 with one or more different nodes in a data structure, such that, when information  
25               associated with the node 50 is displayed to a user accessing the data structure, information associated with another node having a relationship with the node 50 is also displayed to the user. For example, a node associated with the product category (or sub-  
30               category) "pants" and a node associated with the product category (or sub-category) "belts" may have a relationship therebetween such that a user interested in purchasing a pair of pants is also presented with information about belts.

Referring now to Fig. 5, a parent node 60 and a child node 62 hierarchically depending from the parent node 60 are illustrated. The parent node 60 represents a category of products offered for sale at one or more Web sites 32 on a computer network 34, and the child node 62 represents a sub-category of products offered for sale at one or more Web sites 32 on the computer network 34. In the illustrated embodiment, the category represented by the parent node 60 is "Computer Equipment" and the sub-category represented by the child node 62 is "Computer Printers".

The illustrated parent node 60 has one classifier 52 associated therewith that has a name 52a "MANUFACTURER" and a range 52b of values of "HP, IBM". The child node 62 has four classifiers 52 associated therewith, each having names 52a and ranges 52b of values as follows: 1) name "DOTS PER INCH"; range 300x300, 600x600, 1200x1200; 2) name "PAGES PER MINUTE"; range 2, 3, 4, ... 40; 3) name "MANUFACTURER"; range "HP, XEROX, EPSON, LEXMARK"; and 4) name "PRINT PROCESS"; range "DOT MATRIX, INKJET, LASER. Each classifier 52 associated with the child node 62 inherits attribute names and value ranges from the classifier 52 associated with the parent node 60. In the illustrated embodiment, this means that the value of the range of the classifier with the name "MANUFACTURER" would be expanded to include "IBM".

A data structure implemented in accordance with the present invention includes at least one parent node that represents a category of products offered for sale at one or more Web sites on a computer network (e.g., the Internet). At least one

classifier is associated with the parent node, and includes a name of an attribute of the product category and a range of values associated with the product category attribute. At least one child node is hierarchically associated with the parent node. Each child node represents a sub-category of products offered for sale at one or more Web sites on the computer network. At least one classifier is associated with each child node, and includes a name of an attribute of a product sub-category and a range of values associated with a respective product sub-category attribute. Each classifier associated with a child node inherits attribute names and value ranges from classifiers associated with a parent node of the respective child node.

Each child node in a data structure according to the present invention may include a constraint that is associated with a parent node classifier and that reduces or modifies the range of values of the parent node classifier. Each node in a data structure according to the present invention may include culture-specific information and language-specific information, as described above. Moreover, each node in a data structure according to the present invention may include a relationship with one or more other nodes in the data structure such that when information associated with one node is displayed to a user accessing the data structure, information associated with another node is also displayed to the user.

Referring now to **Fig. 6**, an exemplary data structure 70 stored on a computer readable storage medium according to an embodiment of the present invention is illustrated. The illustrated data

structure 70 includes a plurality of nodes 50a-50i arranged in hierarchical order, wherein each node represents a respective category or sub-category of products offered for sale at one or more Web sites 32 on a computer network 34. The illustrated data structure 70 is referred to as a directed acyclical graph (DAG). DAGs can be more efficient to populate with information and to search than conventional tree structures. DAGs are well known to those of skill in the art and need not be described herein. The illustrated data structure 70 has at least one parent node 50a, and a plurality of child nodes 50b-50i hierarchically associated with the parent node 50a. It is understood that some of the child nodes (i.e., nodes 50b, 50c, 50h) can also be parent nodes of other child nodes.

The illustrated data structure 70 has a node 50a associated with the product category "APPAREL" and two nodes 50b, 50c associated with subcategories "PANTS" and "SHOES" depending therefrom. The node 50b associated with the product sub-category "PANTS" has three nodes 50d, 50e, 50f depending therefrom and that are associated with the sub-categories "LONG PANTS", "ATHLETIC PANTS", and "SHORT PANTS", respectively. The node 50c associated with the product sub-category "SHOES" has two nodes 50g, 50h depending therefrom and that are associated with the sub-categories "LEATHER SHOES", and "ATHLETIC SHOES", respectively. The node 50h associated with the product sub-category "ATHLETIC SHOES" has one node 50i depending therefrom that is associated with the product sub-category "CLEATS".

The illustrated node 50a associated with the product category "APPAREL" has three classifiers

52 referred to individually as  $C_1$ ,  $C_2$ , and  $C_3$ .

Classifier  $C_1$  has the name 52a "MATERIAL" and a range 52b of values of "LEATHER, DENIM, COTTON, NYLON".

Classifier  $C_2$  has the name 52a "GENDER" and a range  
5 52b of values of "MEN'S, WOMEN'S". Classifier  $C_3$  has  
the name "STYLE" and a range of values of "FORMAL,  
CASUAL".

The node 50e associated with the product  
sub-category "ATHLETIC PANTS" has a relationship 59  
10 established with the node 50h associated with the  
product sub-category "ATHLETIC SHOES". Accordingly,  
when information associated with "ATHLETIC PANTS"  
(node 50e) is displayed to a user accessing the data  
structure 70 via intermediary Web site 30,  
15 information associated with "ATHLETIC SHOES" (node  
50h) is also displayed to the user.

The node 50h associated with the product  
sub-category "ATHLETIC SHOES" has a classifier 52  
having a name 52a "SPORTS" and a range 52b of values  
20 "BASKETBALL, SOCCER, FOOTBALL". The node 50i  
associated with the product sub-category "CLEATS"  
has a constraint 54 that reduces the range 52b of  
values of the classifier 52 associated with the node  
50h to "SOCCER and FOOTBALL". Accordingly, the  
25 product subcategory "CLEATS" represented by node 50i  
applies only to soccer and football, and not to  
basketball.

The node 50g associated with the product  
sub-category "LEATHER SHOES" has language-specific  
30 information 58 associated therewith. Specifically,  
Spanish and French synonyms for leather shoes  
(zapatillo, zapato, chaussure de plage) are  
included.

Data Structure Content Acquisition

The data structure 70 illustrated in Fig. 6 is for illustrative purposes only. An actual data structure implemented in accordance with embodiments of the present invention will typically have hundreds or thousands of nodes that represent hundreds or thousands of product categories and sub-categories. Once a data structure in accordance with the present invention is created, actual product information from various Web sites 32 is retrieved and associated with respective ones of the nodes.

Referring now to Fig. 7, operations utilized by an intermediary for retrieving information about one or more products offered for sale at Web sites 32 on a computer network 34, according to embodiments of the present invention, are illustrated. As described above, these operations may be performed by a Web server 40 in conjunction with one or more content acquisition application programs 44a.

Initially, an intermediary selects a Web site 32 on a computer network 34 from which to extract product information (Block 100). The intermediary then selects a node from a data structure maintained by the intermediary and stored in a computer readable format on a computer readable/usable storage medium (Block 110). A search request that includes names and value ranges from classifiers associated with the selected node is created (Block 120).

The selected Web site 32 is then searched for products offered for sale that satisfy the search request (Block 130). Information about each product for sale at the selected Web site 32 that

satisfies the search request is retrieved (Block 140). The retrieved information preferably includes at least a name and description of each product found at the Web site that satisfies the search request.

Operations represented by Blocks 100-140 are preferably implemented by a Web server 40 in conjunction with one or more content acquisition application programs 44a. A particularly preferred content acquisition application program is a "spider." A spider is configured to visit Web sites and read Web pages and other information. A spider can be configured to selectively visit and index entire Web sites or specific pages at a Web site. Spiders can crawl through a Web site's pages in several ways. One way is to follow all the hypertext links in each page until all the pages have been read. Spider programs are well understood by those of skill in the art and need not be discussed further herein.

Web sites may include a search engine. As such, the step of searching a Web site may be conducted using the search engine of the Web site.

A method of extracting HTML data from a Web page using Extensible Markup Language (XML) in accordance with an embodiment of the present invention is described below in Example 1.

Retrieved information associated with each product that satisfies a search request is preferably assigned a display priority that determines a priority in which information about a product is displayed to a user accessing the data structure (Block 150). Operations for assigning a display priority to retrieved information may

include assigning a first priority to a product having a name that satisfies the search request, and assigning a second priority that is different than the first priority to a product having a description  
5 that contains one or more words that satisfy the search request.

The retrieved information is stored in a computer readable storage medium with a link to the selected node of the data structure (Block 160).  
10 According to a preferred embodiment, the retrieved information is stored in tables 80a, 80b, 80c of a database 82 as illustrated in Fig. 8. The illustrated database 82 includes a Node/Product table 80a, a Product table 80b, and a  
15 Node/Classifier/Product table 80c.

The illustrated Node/Product table 80a includes a "Node" field, a "Product ID" field, and a "Match Index" field. The "Node" field identifies a product category or sub-category associated with a  
20 particular node of a data structure according to embodiments of the present invention. The "Product ID" field identifies a unique product within the category or sub-category that is currently offered for sale at a Web site.

25 The "Match Index" field contains a value that identifies a display priority of a particular product offered for sale. A "Match Index" value may be obtained by assigning numerical values based on where a user's product search term is found at a  
30 particular Web site. For example, if a user is interested in Nike® shoes, a particular value is assigned to a pair of Nike® shoes offered for sale at a Web site. A lower value may be assigned if a Web site only contains information describing Nike®



shoes, and does not actually offer them for sale. In addition, a "Match Index" value may be assigned based on other factors, such as popularity of the product. In the illustrated Node/Product table 80a, the higher the "Match Index" value, the higher the display priority of a particular product in response to a user search request.

The illustrated Product table 80b includes a "Product ID" field and a "Product Information" field. As described above, the "Product ID" field identifies a unique product within the category or sub-category that is currently offered for sale at a Web site. The "Product Information" field provides descriptive information about a respective product.

The illustrated Node/Classifier/Product table 80c includes a "Node Index" field, a "Classifier Name" field, a "Classifier Value" field, a "Product ID" field, and a "Match Index" field. The "Node Index" field identifies a specific node within a data structure according to the present invention. The "Classifier Name" field identifies a classifier associated with a node. The "Classifier Range of Values" field identifies the range of values of a classifier, as described above. As described above, the "Product ID" field identifies a unique product within the category or sub-category that is currently offered for sale at a Web site. As described above, the "Match Index" field contains a value that identifies a display priority of a particular product offered for sale.

It is understood that data structures according to the present invention may have various tables. The present invention is not limited to the illustrated tables.

Referring back to Fig. 7, a determination is then made whether the selected node of the data structure has a child node depending therefrom (Block 170). If the answer is "No", operations are terminated. If the answer is "Yes", a child node is selected (Block 180) and operations represented by Blocks 120-160 are repeated for the selected child node. This process continues until all child nodes of the originally-selected node have been selected and product information has been retrieved and stored within the data structure.

Operations represented by Blocks 100-180 are repeated for multiple Web sites. In addition, operations represented by Blocks 100-180 are repeated periodically to identify changes in products offered for sale by each Web site, including changes in information (e.g., price) associated with each product.

#### Data Retrieval from Data Structure

Referring now to Fig. 9, operations for retrieving information about products offered for sale at one or more Web sites on a computer network according to embodiments of the present invention are illustrated. Initially, an intermediary receives a product search request from a user via an intermediary Web site (Block 200). A user can provide multi-lingual information within a search request. For example, a French user interested in purchasing "hats", can enter the term "chapeau" and the intermediary Web site will return information from Web sites that sell hats, regardless of the language used by the Web site.

A Web server 40 at the intermediary Web site 30 searches for nodes of a data structure (described above) maintained by the intermediary that satisfy the received search request (Block 210). The intermediary sends the results of the search (i.e., information about products associated with each node) to the user in a prioritized format that is displayable within a user device display (Block 220). For search results that do not match any nodes in the data structure, products that satisfy the search request are retrieved directly based on one or more heuristic search methods.

The Web server 40 (or application program utilized or accessed by the Web server 40 to perform a search of a data structure) uses the structure and content of the data structure to respond to the search request. For example, if the search request is for "rouge chapeau," the Web server 40 looks for all occurrences of the words "rouge" and "chapeau" in the data structure. Scores are assigned to nodes in the data structure based on heuristics. "Rouge" may appear in the range of the classifier "color" associated with a node called (in French) "chapeau." The classifier "color" may also be inherited from a (grand)parent node of the "chapeau" node (e.g., root->apparel->hats). When "chapeau" is itself a node in the data structure, it is assigned a certain score. Whereas another node in the data structure may contain a book concerning hats whose location in the data structure is denoted by (root=>books=>apparel=>"rouge chapeau"). This would receive another score based on its position in the data structure.

Heuristic scores are computed according to

the accuracy of a match of search results with a search request and according to how deep within the data structure a match was found. For example, the node "red hat" would receive a higher score than the node "red hat book" for the search request "red hat." The node identified by the path root=>Apparel=>red hat will receive a higher score than the node denoted by root=>book=>software=>linux=>red hat for the search request "red hat." Classifiers may also affect a score. For example, a node which has classifiers which partially match a search request, but which are not in the node name may receive a higher score than nodes that partially match the search request but do not have a classifier match.

An intermediary Web site according to the present invention is configured to receive user requests to purchase products displayed within search results (Block 230). In response to receiving a user request to purchase a product in the search results, the Web server 40 at the intermediary Web site 30 is configured to execute a purchase transaction on behalf of the user at one or more of the Web sites (Block 240), and to send the results of the executed transaction to the user (Block 250).

According to another embodiment of the present invention, sending the results of a search to a user may include sending a user-manipulatable slider widget to the user with the search results. A slider widget according to the present invention is configured to change the search results displayed within a user device display dynamically in real time in response to user manipulation. Preferably, a slider widget is configured to dynamically change

search results based on the range of values of classifiers associated with nodes of the data structure. For example, a slider widget may be configured to allow a user to change displayed  
5 results based upon sales price (a node classifier) of products in a list.

Unlike existing search technologies that typically require a user to drill down from broad to specific categories, the present invention may allow  
10 consumers to set specific parameters through a series of dynamic slider widgets to define and clarify their search and to avoid browsing through unnecessary search results. Slider widgets allow users to dynamically filter and adjust search  
15 results, thereby instantly refining and redirecting searches, even in multiple languages.

The present invention may facilitate a more natural e-commerce experience because it can avoid the hierarchical access methods of searching prevalent at most e-commerce Web sites. Consumers  
20 can control their own shopping experience by utilizing intelligent keyword searching and on-the-fly customization. For example, while searching for toys, a consumer can specify a price and age range  
25 in real time so that the resulting product descriptions fit both the consumer's budget and a child's developmental level. A consumer can modify search characteristics "mid-stream" (e.g., changing the price range from \$25-\$50 to \$51-\$75) rather than  
30 starting over with a new search, as would be the case with conventional search engines.

Referring now to Fig. 10, a user interface  
85 is displayed that contains search results from a user request made in accordance with the present

invention and that also contains a plurality of slider widgets 86a-86e. The search results displayed relate to computer printers available for sale at one or more Web sites. For each printer available for sale, the following information is provided within the user interface 85: an image 87a, printer name 87b, Web site 87c where printer is being offered for sale, printer category 87d, printer price 87e, whether the printer is "in stock" 87f, printer color 87g, printer dpi (dots per inch) 87h, printer ppm (pages per minute) 87i, and printer memory 87j.

The illustrated slider widgets 86a-86e allow a user to change the displayed search results based on selected printer information. For example, a user may manipulate slider widget 86a to change the displayed search results based on printer category. The user may manipulate slider widget 86b to change the displayed search results based on whether a printer is in stock. The user may manipulate slider widget 86c to change the displayed search results based on printer memory. The user may manipulate slider widget 86d to change the displayed search results based on printer price. The user may manipulate slider widget 86e to change the displayed search results based on printer dpi. Each slider widget 86a-86e provides a range of values that a user can change. For example, the slider widget related to printer dpi may allow a user to display printers for sale that have a range of dpi values (e.g., a range of 300 dpi to 1200 dpi).

A user may manipulate the illustrated slider widgets 86a-86e either alone or in various combinations. For example, a user may wish to see

printers having a price less than \$1,500 that also have a dpi of greater than 600.

#### Multi-Site Product Purchasing

5           The present invention may further enhance the e-commerce experience by allowing items from multiple merchants to be purchased in any language via a unified checkout procedure. Accordingly, the time and drudgery that is often involved in filling  
10       out order forms and logging on and off of multiple sites may be reduced.

          A Web server 40 of an intermediary Web site according to the present invention is preferably configured to execute a transaction with  
15       individual Web sites on behalf of a user and without requiring a user to communicate with the individual Web sites. For example, when first and second Web sites each have respective on-line shopping cart applications executing thereon, a Web server  
20       according to the present invention provides information about the first product and the user to the first Web site shopping cart application, and provides information about the second product and the user to the second Web site shopping cart  
25       application. Each transaction can be completed without requiring any involvement by the user. As would be understood by those of skill in the art, purchasing transactions conducted in accordance with the present invention may be performed using various  
30       secure methods, including, but not limited to SSL (Secure Sockets Layer) technology.

#### Example 1

XML is currently a formal recommendation from the

World Wide Web Consortium as a way to make the Web a more versatile tool. XML syntax guidelines and the definition of XML entities are presented in the Extensible Markup Language (XML) 1.0 Specification, February 10, 1998, which is incorporated herein by reference in its entirety and which is available from the World Wide Web Consortium ([www.w3.org](http://www.w3.org)) and specifically at ([www.w3.org/TR/1998/REC-xml-19980210](http://www.w3.org/TR/1998/REC-xml-19980210)).

XML is similar to HTML in that both languages are subsets of Standard Generalized Markup Language (SGML) and that both utilize tags to describe the contents of a page or file. HTML, however, describes the content of a Web page (mainly text and graphic images) only in terms of how content is to be displayed and interacted with. XML describes the content in terms of what data is being described. For example, a <PHONENUM> tag could indicate that the data following the tag is a phone number. This means that an XML file can be processed purely as data by a program or it can be stored with similar data on another computer or, like an HTML file, that it can be displayed. For example, depending on how the application program in the receiving computer wanted to handle the phone number, it could be stored, displayed, or dialed. XML is "extensible" because, unlike HTML, XML markup tags can be unlimited and can be self-defining.

The structure of an XML document is essentially a tree. The root element is the top-level element, and its descendants (i.e., the other elements) branch out from there. XML parsers are applications that examine XML code and report forming errors. An XML parser reads XML files,



generates a hierarchically structured tree, herein referred to as a Document Object Model Tree ("DOM Tree"), and then hands off data to viewers and other applications for processing.

5 Document Type Definitions (DTDs) may accompany an XML document, essentially defining the rules of the XML document, such as which elements are present and the structural relationship between the elements. DTDs can help validate data when a  
10 receiving application does not have a built-in description of the incoming XML data.

The following XML-DTD describes the syntax for extracting data from a Web site according to an embodiment of the present invention.

```

15      <?xml version="1.0" encoding="UTF-8"?>
      <!ELEMENT ProdPage (Pid, Field+)>
      <!ELEMENT Field (TextField | Url | Form | Properties)>
      <!ATTLIST Field
20          name CDATA #REQUIRED
      >
      <!ELEMENT TextField (TextPattern+)>
      <!ELEMENT Url (UrlPattern+)>
      <!ELEMENT Form EMPTY>
25      <!ATTLIST Form
          formNo CDATA #REQUIRED
      >
      <!ELEMENT Properties (PropertiesPattern+)>
      <!ELEMENT Pattern (TextPattern | UrlPattern |
30      PropertiesPattern)>
      <!ELEMENT TextPattern (Prefix, TextGetter, StringOp?,
          Suffix?, Boundary?)>
      <!ELEMENT UrlPattern (Prefix, Suffix?, Boundary?)>
      <!ELEMENT PropertiesPattern (Prefix, TextGetter,
35      StringOp?, Suffix?, Boundary?, Delimiters)>
      <!ELEMENT Prefix (#PCDATA | Seek)*>
      <!ELEMENT Seek (SingleSeek)+>
      <!ELEMENT SingleSeek (TokenNumber | (TokenRegex |

```

```

Regex))*>
<!--ELEMENT TokenNumber EMPTY>
<!--ATTLIST TokenNumber
      tagname CDATA #REQUIRED
5      index NMTOKEN #REQUIRED
>
<!--ELEMENT TokenRegex (AttrToken)*>
<!--ELEMENT AttrToken (Regex)>
<!--ATTLIST AttrToken
10      attrname CDATA #REQUIRED
>
<!--ELEMENT Regex (#PCDATA)>
<!--ELEMENT StringOp (SubString | Append)>
<!--ELEMENT TextGetter (GetNextPcData | GetTextUntil)>
15 <!--ELEMENT GetNextPcData EMPTY>
<!--ELEMENT GetTextUntil (Boundary)>
<!--ELEMENT Suffix (Seek)>
<!--ELEMENT Boundary (Seek)>
<!--ELEMENT Pid (StringOp)>
20 <!--ELEMENT Delimiters EMPTY>
<!--ATTLIST Delimiters
      delims CDATA #REQUIRED
>
<!--ELEMENT SubString (#PCDATA)>
25 <!--ELEMENT Append (#PCDATA)>
<!--ELEMENT TagName (#PCDATA)>
<!--ATTLIST TokenRegex
      TagName CDATA #REQUIRED
>
30

```

The following shows how the above XML file  
 is used to describe the structure of a product page  
 at the Web site [www.barnesandnoble.com](http://www.barnesandnoble.com). The  
 extension "ext" is used for such files and are  
 called extractor files.

```

<?xml version="1.0" encoding="UTF-8"?>
40 <!--DOCTYPE ProdPage SYSTEM

```

```

"d:\muggy\o3cprototype\documents\Extractor.dtd">
<ProdPage>
  <Pid>
    <StringOp>
      <SubString/>
    </StringOp>
  </Pid>
  <Field name="Name">
    <TextField>
      <TextPattern>
        <Prefix>
          <Seek>
            <SingleSeek>
              <TokenRegex TagName="IMG">
                <AttrToken attrname="SRC">

<Regex>gresources/gutter_default.gif</Regex>
              </AttrToken>
            </TokenRegex>
          <TokenRegex TagName="/TD"/>
          <TokenRegex TagName="TD"/>
          <TokenRegex TagName="FONT"/>
            </SingleSeek>
          </Seek>
        </Prefix>
      <TextGetter>
        <GetTextUntil>
          <Boundary>
            <Seek>
              <SingleSeek>
                <TokenRegex TagName="BR"/>
              </SingleSeek>
            </Seek>
          </Boundary>
        </GetTextUntil>
      </TextGetter>
    </TextPattern>
  </TextField>
</Field>
  <Field name="imgUrl">
    <Url>

```

```

        <UrlPattern>
            <Prefix>
                <Seek>
                    <SingleSeek>
5                     <TokenRegex TagName="IMG">
                        <AttrToken attrname="SRC">
                            <Regex>Bookcover</Regex>
                        </AttrToken>
                    </TokenRegex>
10                </SingleSeek>
                </Seek>
            </Prefix>
            <Boundary>
                <Seek>
15                <SingleSeek>
                    <TokenRegex TagName ="TABLE"/>
                </SingleSeek>
                </Seek>
            </Boundary>
20        </UrlPattern>
    </Url>
</Field>
<Field name="Properties">
    <Properties>
25        <PropertiesPattern>
            <Prefix>imgUrl</Prefix>
            <TextGetter>
                <GetTextUntil>
                    <Boundary>
30                <Seek>
                    <SingleSeek>
                        <TokenRegex TagName="IMG"/>
                        <TokenRegex TagName="BR"/>
                    </SingleSeek>
35                </Seek>
            </Boundary>
            </GetTextUntil>
            </TextGetter>
            <StringOp>
40                <SubString/>
            </StringOp>

```

```

        <Delimiters delims=":"/>
    </PropertiesPattern>
</Properties>
</Field>
5   <Field name="Desc">
    <TextField>
        <TextPattern>
            <Prefix>
                <Seek>
10          <SingleSeek>
                <Regex>From the Publisher</Regex>
            </SingleSeek>
        </Seek>
    </Prefix>
15    <TextGetter>
        <GetNextPcData/>
    </TextGetter>
    </TextPattern>
    </TextField>
20
    <TextField>
        <TextPattern>
            <Prefix>
                <Seek>
25          <SingleSeek>
                <Regex>From the Library
Journal</Regex>
            </SingleSeek>
        </Seek>
30    </Prefix>
        <TextGetter>
            <GetNextPcData/>
        </TextGetter>
    </TextPattern>
35    </TextField>
    </Field>
</ProdPage>

```

Any XML tool with the capability of  
40 validating XML documents against a DTD can be used

to generate the extractor files. A configuration file according to an embodiment of the present invention stores configuration information such as URL of a Web page and the locations of all the "extractor" files. An exemplary configuration file is illustrated below.

```

    <site name="Barnesandnoble" home=www.bn.com
navigation-type=1>
    <search-page file="bnSearchPage.ext"/>
10    <product-list file="bnProductList.ext"/>
    <product-page file="bnCompProductPage.ext"/>
    <error-log file="bnCompError.log">
    </site>

```

15 The <Seek> tag allows a user to specify a regular expression to extract information from a web page. The following example extracts the "Name" of a product from a Web page:

```

20 <Field name="Name">
    <TextField>
        <TextPattern>
            <Prefix>
                <Seek>
25                <SingleSeek>
                    <TokenRegex TagName="IMG">
                        <AttrToken attrname="SRC">
                            <Regex>gresources/gutter_default.gif</Regex>
30                        </AttrToken>
                    </TokenRegex>
                    <TokenRegex TagName="/TD"/>
                    <TokenRegex TagName="TD"/>
                    <TokenRegex TagName="FONT"/>
35                </SingleSeek>
            </Seek>
        </Prefix>
    <TextGetter>
        <GetTextUntil>

```

```

        <Boundary>
            <Seek>
                <SingleSeek>
                    <TokenRegex TagName="BR"/>
5                </SingleSeek>
                </Seek>
            </Boundary>
        </GetTextUntil>
        </TextGetter>
10    </TextPattern>
        </TextField>
    </Field>

```

15 The "Field" denoted "Name" is being extracted,  
 wherein "Name" is a text field. "TextField" is  
 sought using a construct called "TextPattern". An  
 argument to the "TextPattern" is a "Prefix". To  
 locate the "Prefix" a "Seek" is used. A series of  
 20 constructs called "Regex" are used to search for the  
 particular prefix. At this point, the "Name" of the  
 product has been located. "TextGetter" is then used  
 which retrieves all the text in the Web page until  
 the HTML tag <br>, which located using the "Seek"  
 25 construct as explained above.

### Example 2

Referring now to Figs. 11-12, exemplary  
 user interfaces that illustrate various embodiments  
 30 of the present invention are provided. Referring  
 initially to Fig. 11, an exemplary user interface  
 1000 served by an intermediary Web site, according  
 to an embodiment of the present invention is  
 illustrated. The user interface 1000 is displayed  
 35 within a browser window 1002 and includes links 1004  
 to various retailer Web sites. In addition, the

illustrated user interface 1000 includes a search field 1006 within which a user can enter search terms regarding various products of interest to the user. In the illustrated user interface 1000, a user  
5 has entered the search term "gloves".

Upon activation of search button 1008, a search of a data structure as described above is initiated for the term "gloves" and search results are returned to the user in the user interface 1010  
10 illustrated in Fig. 12. The search results displayed within the user interface 1010 of Fig. 12 include a name 1010a, description 1010b, and price 1010c of each product satisfying the search criteria.

15 Example 3

Referring now to Fig. 13, an exemplary user interface 1020 is illustrated that displays products for sale by various Web sites that were  
selected by a user in accordance with the present  
20 invention. The selected products include a GPS satellite navigator 1024, a pocket organizer 1026, and a portable DVD player 1028. Each of the selected products is for sale by a different Web site. For example, the GPS satellite navigator 1024 is offered  
25 for sale by the Web site www.fogdog.com; the pocket organizer 1026 is offered for sale by the Web site www.warehouse.com; and the portable DVD player 1028 is offered for sale by the Web site www.800.com.

Preferably, a user is pre-registered with  
30 an intermediary prior to conducting searches for products for sale in accordance with the present invention. Accordingly, at "check-out" time, the intermediary can simply request verification of various information such as shipping and billing



information. In the illustrated user interface 1020, the user is presented with a payment field 1030 and a shipping field 1032 for each displayed product. In addition, a shipping address field 1034 is provided.

5 Upon selecting and/or verifying that the displayed shipping and billing information is correct, a user can activate the "Submit" button 1036 to have the intermediary execute respective transactions at each of the three Web sites (www.fogdog.com;

10 www.warehouse.com; and www.800.com) on behalf of the user and without requiring the user to communicate with the Web sites.

The foregoing is illustrative of the present invention and is not to be construed as

15 limiting thereof. Although a few exemplary embodiments of this invention have been described, those skilled in the art will readily appreciate that many modifications are possible in the exemplary embodiments without materially departing

20 from the novel teachings and advantages of this invention. Accordingly, all such modifications are intended to be included within the scope of this invention as defined in the claims. Therefore, it is to be understood that the foregoing is illustrative

25 of the present invention and is not to be construed as limited to the specific embodiments disclosed, and that modifications to the disclosed embodiments, as well as other embodiments, are intended to be included within the scope of the appended claims.

30 The invention is defined by the following claims, with equivalents of the claims to be included therein.

## THAT WHICH IS CLAIMED IS:

1. A data structure stored on a computer readable storage medium, the data structure comprising:

5 a parent node, wherein the parent node represents a category of products offered for sale at one or more Web sites on a computer network;  
at least one classifier associated with the parent node, wherein each classifier comprises a name of an attribute of the product category and a  
10 range of values associated with the respective product category attribute;

a child node hierarchically associated with the parent node, wherein the child node represents a sub-category of products offered for  
15 sale at one or more Web sites on the computer network; and

at least one classifier associated with the child node, wherein each classifier comprises a name of an attribute of the product sub-category and  
20 a range of values associated with the product sub-category attribute;

wherein each classifier associated with the child node inherits attribute names and value ranges from classifiers associated with the parent  
25 node.

2. The data structure according to Claim 1, further comprising a constraint associated with a parent node classifier, wherein the constraint  
5 reduces the range of values of the parent node classifier.

3. The data structure according to Claim 1, further comprising a constraint associated with a child node classifier, wherein the constraint reduces the range of values of the child node classifier.

4. The data structure according to Claim 1 further comprising culture-specific information associated with the parent node, wherein the culture-specific information comprises information about the product category relative to one or more human cultures.

5. The data structure according to Claim 1 further comprising culture-specific information associated with a child node, wherein the culture-specific information comprises information about the product sub-category relative to one or more human cultures.

6. The data structure according to Claim 1 further comprising language-specific information associated with the parent node, wherein the language-specific information comprises information about the product category relative to one or more human languages.

7. The data structure according to Claim 1 further comprising language-specific information associated with a child node, wherein the language-specific information comprises information about the product sub-category relative to one or more human languages.

8. The data structure according to Claim 1 further comprising a relationship between the parent node and the child node such that when information associated with the parent node is displayed to a user accessing the data structure, information associated with the child node is also displayed to the user.

9. The data structure according to Claim 1 further comprising a relationship between a first child node and a second child node such that when information associated with the first child node is displayed to a user accessing the data structure, information associated with the second child node is also displayed to the user.

10. A data structure stored on a computer readable storage medium, the data structure comprising:

a plurality of nodes arranged in hierarchical order, wherein each node represents a respective category or sub-category of products offered for sale at one or more Web sites on a computer network;

at least one classifier associated with one or more of the nodes, wherein each classifier comprises a name of an attribute of a product category or sub-category and a range of values associated with a respective attribute, wherein each classifier associated with a node that is a child node of a parent node inherits attribute names and value ranges from one or more classifiers associated with the parent node; and

language-specific information associated  
with at least one node, wherein the language-  
20 specific information comprises information about a  
product category or subcategory relative to one or  
more human languages.

11. The data structure according to Claim  
10 further comprising at least one constraint  
associated with a node classifier, wherein the  
constraint reduces the range of values of the node  
5 classifier.

12. The data structure according to Claim  
10 further comprising culture-specific information  
associated with a node, wherein the culture-specific  
information comprises information about a product  
5 category or sub-category relative to one or more  
human cultures.

13. The data structure according to Claim  
10 further comprising a relationship between a first  
node and a second node such that when information  
associated with the first node is displayed to a  
5 user accessing the data structure, information  
associated with the second node is also displayed to  
the user.

14. A method of retrieving information  
about one or more products offered for sale at a Web  
site on a computer network, the method comprising  
the following steps performed by an intermediary:  
5 selecting a Web site on the computer  
network;  
selecting a node from a data structure

stored on a computer readable storage medium,  
wherein the data structure comprises:

- 10                   at least one parent node that  
                  represents a category of products offered  
                  for sale at one or more Web sites on the  
                  computer network;
- 15                   at least one classifier associated  
                  with the parent node, wherein each  
                  classifier comprises a name of an  
                  attribute of the product category and a  
                  range of values associated with the  
                  product category attribute;
- 20                   at least one child node  
                  hierarchically associated with the parent  
                  node, wherein each child node represents a  
                  sub-category of products offered for sale  
                  at one or more Web sites on the computer  
25                   network; and
- at least one classifier associated  
                  with each child node, wherein each  
                  classifier comprises a name of an  
                  attribute of a product sub-category and a  
30                   range of values associated with a  
                  respective product sub-category attribute;
- wherein each classifier associated  
                  with a child node inherits attribute names  
                  and value ranges from classifiers  
35                   associated with a parent node of the  
                  respective child node;
- creating a search request that comprises  
                  names and value ranges from classifiers associated  
                  with the selected node;
- 40                   searching the selected Web site for  
                  products offered for sale that satisfy the search

request; and

retrieving information about each product  
for sale at the selected Web site that satisfies the  
45 search request, wherein the retrieved information  
comprises at least a name and description of each  
product.

15. The method according to Claim 14  
wherein the selected Web site comprises a search  
engine and wherein the step of searching is  
conducted using the search engine of the Web site.

16. The method according to Claim 14,  
further comprising the step of storing the retrieved  
information in a computer readable storage medium  
with a link to the selected node.

17. The method according to Claim 14  
further comprising the step of assigning a display  
priority to the retrieved information associated  
with each product that satisfies the search request,  
5 wherein a display priority determines a priority in  
which information about a product is displayed to a  
user accessing the data structure.

18. The method according to Claim 17  
wherein the step of assigning a display priority to  
the retrieved information comprises:

assigning a first priority to a product  
5 having a name that satisfies the search request; and  
assigning a second priority that is  
different than the first priority to a product  
having a description that contains one or more words  
that satisfy the search request.

19. The method according to Claim 18 wherein the selected node is a parent node and further comprising the following steps performed by the intermediary:

- 5                   selecting a child node from the data structure stored on the computer readable storage medium, wherein the child node is hierarchically related to the parent node;
- creating a search request that comprises
- 10                   names and value ranges from classifiers associated with the selected child node;
- searching the selected Web site for products offered for sale that satisfy the search request; and
- 15                   retrieving information about each product for sale at the selected Web site that satisfies the search request, wherein the retrieved information comprises at least a name and a description of each product.

20. A method of retrieving information about one or more products offered for sale at a Web site on a computer network, the method comprising the following steps performed by an intermediary:

- 5                   selecting a Web site on the computer network;
- selecting a node from a data structure stored on a computer readable storage medium, wherein the data structure comprises:
- 10                   at least one parent node that represents a category of products offered for sale at one or more Web sites on the computer network;
- at least one classifier associated



15                   with the parent node, wherein each  
                  classifier comprises a name of an  
                  attribute of the product category and a  
                  range of values associated with the  
                  product category attribute;

20                   at least one child node  
                  hierarchically associated with the parent  
                  node, wherein each child node represents a  
                  sub-category of products offered for sale  
                  at one or more Web sites on the computer  
25                   network; and  
                  at least one classifier associated  
                  with each child node, wherein each  
                  classifier comprises a name of an  
                  attribute of a product sub-category and a  
30                   range of values associated with a  
                  respective product sub-category attribute;  
                  wherein each classifier associated  
                  with a child node inherits attribute names  
                  and value ranges from classifiers  
35                   associated with a parent node of the  
                  respective child node;  
                  creating a search request that comprises  
                  names and value ranges from classifiers associated  
                  with the selected node;

40                   searching the selected Web site for  
                  products offered for sale that satisfy the search  
                  request;  
                  retrieving information about each product  
                  for sale at the selected Web site that satisfies the  
45                   search request, wherein the retrieved information  
                  comprises at least a name and description of each  
                  product;  
                  assigning a display priority to the

retrieved information associated with each product  
50 that satisfies the search request, wherein a display  
priority determines a priority in which information  
about a product is displayed to a user accessing the  
data structure; and

storing the retrieved information in a  
55 computer readable storage medium with an assigned  
display priority and a link to the selected node.

21. The method according to Claim 20  
wherein the selected Web site comprises a search  
engine and wherein the step of searching is  
conducted using the search engine of the Web site.

22. The method according to Claim 20  
wherein the step of assigning a display priority to  
the retrieved information comprises:

assigning a first priority to a product  
5 having a name that satisfies the search request; and  
assigning a second priority that is  
different than the first priority to a product  
having a description that contains one or more words  
that satisfy the search request.

23. The method according to Claim 20  
wherein the selected node is a parent node and  
further comprising the following steps performed by  
the intermediary:

5 selecting a child node from the data  
structure stored on the computer readable storage  
medium, wherein the child node is hierarchically  
related to the parent node;

creating a search request that comprises  
10 names and value ranges from classifiers associated

with the selected child node;

searching the selected Web site for products offered for sale that satisfy the search request; and

15           retrieving information about each product for sale at the selected Web site that satisfies the search request, wherein the retrieved information comprises at least a name and a description of each product.

24. A method of locating products offered for sale at one or more Web sites on a computer network, the method comprising the following steps performed by an intermediary:

5           receiving a product search request from a user;

searching for nodes of a data structure that satisfy the received search request, wherein the data structure is stored on a computer readable storage medium and comprises:

10

at least one parent node that represents a category of products offered for sale at one or more of the Web sites on the computer network;

15           at least one classifier associated with each parent node, wherein each classifier comprises a name of an attribute of a product category and a range of values associated with the respective product category attribute;

20

at least one child node hierarchically related to a parent node, wherein each child node represents a sub-category of products offered for sale at

25                   one or more of the Web sites on the  
                    computer network; and  
                    at least one classifier associated  
                    with each child node, wherein each  
                    classifier comprises a name of an  
30                   attribute of a product sub-category and a  
                    range of values associated with a product  
                    sub-category attribute;  
                    wherein each classifier associated  
                    with a child node inherits attribute names  
35                   and value ranges from classifiers  
                    associated with a parent node;  
                    sending results of the search to the user,  
                    wherein the search results comprise a list of one or  
                    more products offered for sale at one or more of the  
40                   Web sites that satisfy the received user request.

25. The method according to Claim 24  
wherein the step of sending search results to the  
user comprises sending the search results in a  
format displayable within a user device display.

26. The method according to Claim 25  
further comprising sending a user-manipulatable  
slider widget to the user with the search results,  
wherein the slider widget is configured to change  
5                   the search results displayed within a user device  
                    display in real time in response to user  
                    manipulation of the slider widget.

27. The method according to Claim 26  
wherein  
the slider widget is configured to allow a user to  
change displayed results based upon sales price of

5 products in the list.

28. The method according to Claim 26 wherein the slider widget is configured to allow a user to change displayed results based upon a range of values of an attribute of products in the list.

29. The method according to Claim 24 further comprising the step of receiving a user request to purchase at least one product within the list.

30. The method according to Claim 29 further comprising the step of executing a purchase transaction on behalf of the user at one or more of the Web sites in response to receiving the user  
5 request to purchase at least one product within the list.

31. A method of purchasing products from multiple Web sites on a computer network, the method comprising the following steps performed by an intermediary:

5 receiving a product purchase request from a user that comprises a request to purchase a first product from a first Web site and a second product from a second Web site;

10 executing a transaction with the first Web site to purchase the first product on behalf of the user and without requiring the user to communicate with the first Web site;

15 executing a transaction with the second Web site to purchase the second product on behalf of the user and without requiring the user to

communicate with the second Web site; and  
sending results of the executed  
transactions with the first and second Web sites to  
the user.

32. The method according to Claim 31  
wherein the first and second Web sites each have  
respective on-line shopping cart applications  
executing thereon, wherein the step of executing a  
5 transaction with the first Web site to purchase the  
first product comprises providing information about  
the first product and the user to the first Web site  
shopping cart application, and wherein the step of  
executing a transaction with the second Web site to  
10 purchase the second product comprises providing  
information about the second product and the user to  
the second Web site shopping cart application.

33. The method according to Claim 31  
wherein the step of sending results of the executed  
transactions with the first and second Web sites to  
the user comprises sending the results in a format  
5 displayable within a user device display.

34. A data processing system for  
retrieving information about one or more products  
offered for sale at a Web site on a computer  
network, comprising:

5 means for selecting a Web site on the  
computer network;

means for selecting a node from a data  
structure stored on a computer readable storage  
medium, wherein the data structure comprises:  
10 at least one parent node that

represents a category of products offered for sale at one or more Web sites on the computer network;

15           at least one classifier associated with the parent node, wherein each classifier comprises a name of an attribute of the product category and a range of values associated with the product category attribute;

20           at least one child node hierarchically associated with the parent node, wherein each child node represents a sub-category of products offered for sale at one or more Web sites on the computer network; and

25           at least one classifier associated with each child node, wherein each classifier comprises a name of an attribute of a product sub-category and a range of values associated with a  
30           respective product sub-category attribute;

              wherein each classifier associated with a child node inherits attribute names and value ranges from classifiers  
35           associated with a parent node of the respective child node;

              means for creating a search request that comprises names and value ranges from classifiers associated with the selected node;

40           means for searching the selected Web site for products offered for sale that satisfy the search request; and

              means for retrieving information about each product for sale at the selected Web site that

45 satisfies the search request, wherein the retrieved information comprises at least a name and description of each product.

35. The data processing system according to Claim 34 wherein the selected Web site comprises a search engine and wherein the means for searching utilizes the search engine of the Web site.

36. The data processing system according to Claim 34, further comprising means for storing the retrieved information in a computer readable storage medium with a link to the selected node.

37. The data processing system according to Claim 34 further comprising means for assigning a display priority to the retrieved information associated with each product that satisfies the  
5 search request, wherein a display priority determines a priority in which information about a product is displayed to a user accessing the data structure.

38. The data processing system according to Claim 37 wherein the means for assigning a display priority to the retrieved information comprises:

5 means for assigning a first priority to a product having a name that satisfies the search request; and

means for assigning a second priority that is different than the first priority to a product  
10 having a description that contains one or more words that satisfy the search request.



39. The data processing system according to Claim 38 wherein the selected node is a parent node and further comprising:

5 means for selecting a child node from the data structure stored on the computer readable storage medium, wherein the child node is hierarchically related to the parent node;

means for creating a search request that comprises names and value ranges from classifiers  
10 associated with the selected child node;

means for searching the selected Web site for products offered for sale that satisfy the search request; and

means for retrieving information about  
15 each product for sale at the selected Web site that satisfies the search request, wherein the retrieved information comprises at least a name and a description of each product.

40. A data processing system for retrieving information about one or more products offered for sale at a Web site on a computer network, comprising:

5 means for selecting a Web site on the computer network;

means for selecting a node from a data structure stored on a computer readable storage medium, wherein the data structure comprises:

10 at least one parent node that represents a category of products offered for sale at one or more Web sites on the computer network;

at least one classifier associated  
15 with the parent node, wherein each

classifier comprises a name of an attribute of the product category and a range of values associated with the product category attribute;

20           at least one child node hierarchically associated with the parent node, wherein each child node represents a sub-category of products offered for sale at one or more Web sites on the computer network; and

25           at least one classifier associated with each child node, wherein each classifier comprises a name of an attribute of a product sub-category and a range of values associated with a  
30           respective product sub-category attribute;

          wherein each classifier associated with a child node inherits attribute names and value ranges from classifiers  
35           associated with a parent node of the respective child node;

          means for creating a search request that comprises names and value ranges from classifiers associated with the selected node;

40           means for searching the selected Web site for products offered for sale that satisfy the search request;

          means for retrieving information about each product for sale at the selected Web site that  
45           satisfies the search request, wherein the retrieved information comprises at least a name and description of each product;

          means for assigning a display priority to the retrieved information associated with each

50 product that satisfies the search request, wherein a  
display priority determines a priority in which  
information about a product is displayed to a user  
accessing the data structure; and  
means for storing the retrieved  
55 information in a computer readable storage medium  
with an assigned display priority and a link to the  
selected node.

41. The data processing system according  
to Claim 40 wherein the selected Web site comprises  
a search engine and wherein the means for searching  
utilizes the search engine of the Web site.

42. The data processing system according  
to Claim 40 wherein the means for assigning a  
display priority to the retrieved information  
comprises:

5 means for assigning a first priority to a  
product having a name that satisfies the search  
request; and

means for assigning a second priority that  
is different than the first priority to a product  
10 having a description that contains one or more words  
that satisfy the search request.

43. The data processing system according  
to Claim 40 wherein the selected node is a parent  
node and further comprising:

means for selecting a child node from the  
5 data structure stored on the computer readable  
storage medium, wherein the child node is  
hierarchically related to the parent node;

means for creating a search request that

comprises names and value ranges from classifiers  
10 associated with the selected child node;  
means for searching the selected Web site  
for products offered for sale that satisfy the  
search request; and  
means for retrieving information about  
15 each product for sale at the selected Web site that  
satisfies the search request, wherein the retrieved  
information comprises at least a name and a  
description of each product.

44. A data processing system for locating  
products offered for sale at one or more Web sites  
on a computer network, comprising:

means for receiving a product search  
5 request from a user;  
means for searching for nodes of a data  
structure that satisfy the received search request,  
wherein the data structure is stored on a computer  
readable storage medium and comprises:  
10 at least one parent node that  
represents a category of products offered  
for sale at one or more of the Web sites  
on the computer network;  
at least one classifier associated  
15 with each parent node, wherein each  
classifier comprises a name of an  
attribute of a product category and a  
range of values associated with the  
respective product category attribute;  
20 at least one child node  
hierarchically related to a parent node,  
wherein each child node represents a sub-  
category of products offered for sale at

one or more of the Web sites on the  
25 computer network; and  
at least one classifier associated  
with each child node, wherein each  
classifier comprises a name of an  
30 attribute of a product sub-category and a  
range of values associated with a product  
sub-category attribute;  
wherein each classifier associated  
with a child node inherits attribute names  
and value ranges from classifiers  
35 associated with a parent node;  
means for sending results of the search to  
the user, wherein the search results comprise a list  
of one or more products offered for sale at one or  
more of the Web sites that satisfy the received user  
40 request.

45. The data processing system according  
to Claim 44 wherein the means for sending search  
results to the user comprises means for sending the  
search results in a format displayable within a user  
5 device display.

46. The data processing system according  
to Claim 45 further comprising means for sending a  
user-manipulatable slider widget to the user with  
the search results, wherein the slider widget is  
5 configured to change the search results displayed  
within a user device display in real time in  
response to user manipulation of the slider widget.

47. The data processing system according  
to Claim 46 wherein the slider widget is configured

to allow a user to change displayed results based upon sales price of products in the list.

48. The data processing system according to Claim 46 wherein the slider/widget is configured to allow a user to change displayed results based upon a range of values of an attribute of products  
5 in the list.

49. The data processing system according to Claim 44 further comprising means for receiving a user request to purchase at least one product within the list.

50. The data processing system according to Claim 49 further comprising means for executing a purchase transaction on behalf of the user at one or more of the Web sites in response to receiving the  
5 user request to purchase at least one product within the list.

51. A data processing system for purchasing products from multiple Web sites on a computer network, comprising:

means for receiving a product purchase  
5 request from a user that comprises a request to purchase a first product from a first Web site and a second product from a second Web site;

means for executing a transaction with the first Web site to purchase the first product on  
10 behalf of the user and without requiring the user to communicate with the first Web site;

means for executing a transaction with the second Web site to purchase the second product on

behalf of the user and without requiring the user to  
15 communicate with the second Web site; and  
means for sending results of the executed  
transactions with the first and second Web sites to  
the user.

52. The data processing system according  
to Claim 51 wherein the first and second Web sites  
each have respective on-line shopping cart  
applications executing thereon, wherein the means  
5 for executing a transaction with the first Web site  
to purchase the first product comprises means for  
providing information about the first product and  
the user to the first Web site shopping cart  
application, and wherein the means for executing a  
10 transaction with the second Web site to purchase the  
second product comprises means for providing  
information about the second product and the user to  
the second Web site shopping cart application.

53. The data processing system according  
to Claim 51 wherein the means for sending results of  
the executed transactions with the first and second  
Web sites to the user comprises means for sending  
5 the results in a format displayable within a user  
device display.

54. A computer program product for  
retrieving information about one or more products  
offered for sale at a Web site on a computer  
network, the computer program product comprising a  
5 computer usable storage medium having computer  
readable program code embodied in the medium, the  
computer readable program code comprising:

computer readable program code for  
selecting a Web site on the computer network;  
10 computer readable program code for  
selecting a node from a data structure stored on a  
computer readable storage medium, wherein the data  
structure comprises:

at least one parent node that  
15 represents a category of products offered  
for sale at one or more Web sites on the  
computer network;

at least one classifier associated  
with the parent node, wherein each  
20 classifier comprises a name of an  
attribute of the product category and a  
range of values associated with the  
product category attribute;

at least one child node  
25 hierarchically associated with the parent  
node, wherein each child node represents a  
sub-category of products offered for sale  
at one or more Web sites on the computer  
network; and

30 at least one classifier associated  
with each child node, wherein each  
classifier comprises a name of an  
attribute of a product sub-category and a  
range of values associated with a  
35 respective product sub-category attribute;

wherein each classifier associated  
with a child node inherits attribute names  
and value ranges from classifiers  
associated with a parent node of the  
40 respective child node;  
computer readable program code for



creating a search request that comprises names and value ranges from classifiers associated with the selected node;

45                    computer readable program code for  
searching the selected Web site for products offered  
for sale that satisfy the search request; and  
                    computer readable program code for  
retrieving information about each product for sale  
50                    at the selected Web site that satisfies the search  
request, wherein the retrieved information comprises  
at least a name and description of each product.

55.    The computer program product  
according to Claim 54 wherein the selected Web site  
comprises a search engine and wherein the computer  
readable program code for searching utilizes the  
5                    search engine of the Web site.

56.    The computer program product  
according to Claim 54, further comprising computer  
readable program code for storing the retrieved  
information in a computer readable storage medium  
5                    with a link to the selected node.

57.    The computer program product  
according to Claim 54 further comprising computer  
readable program code for assigning a display  
priority to the retrieved information associated  
5                    with each product that satisfies the search request,  
wherein a display priority determines a priority in  
which information about a product is displayed to a  
user accessing the data structure.

58.    The computer program product

according to Claim 57 wherein the computer readable program code for assigning a display priority to the retrieved information comprises:

- 5                   computer readable program code for  
assigning a first priority to a product having a  
name that satisfies the search request; and  
                  computer readable program code for  
assigning a second priority that is different than  
10               the first priority to a product having a description  
that contains one or more words that satisfy the  
search request.

59. The computer program product  
according to Claim 58 wherein the selected node is a  
parent node and further comprising:

- computer readable program code for  
5               selecting a child node from the data structure  
stored on the computer readable storage medium,  
wherein the child node is hierarchically related to  
the parent node;  
                  computer readable program code for  
10           creating a search request that comprises names and  
value ranges from classifiers associated with the  
selected child node;  
                  computer readable program code for  
searching the selected Web site for products offered  
15           for sale that satisfy the search request; and  
                  computer readable program code for  
retrieving information about each product for sale  
at the selected Web site that satisfies the search  
request, wherein the retrieved information comprises  
20           at least a name and a description of each product.

60. A computer program product for

retrieving information about one or more products offered for sale at a Web site on a computer network, the computer program product comprising a computer usable storage medium having computer readable program code embodied in the medium, the computer readable program code comprising:

computer readable program code for selecting a Web site on the computer network;

computer readable program code for selecting a node from a data structure stored on a computer readable storage medium, wherein the data structure comprises:

at least one parent node that represents a category of products offered for sale at one or more Web sites on the computer network;

at least one classifier associated with the parent node, wherein each classifier comprises a name of an attribute of the product category and a range of values associated with the product category attribute;

at least one child node hierarchically associated with the parent node, wherein each child node represents a sub-category of products offered for sale at one or more Web sites on the computer network; and

at least one classifier associated with each child node, wherein each classifier comprises a name of an attribute of a product sub-category and a range of values associated with a

respective product sub-category attribute;  
wherein each classifier associated  
with a child node inherits attribute names  
and value ranges from classifiers  
40 associated with a parent node of the  
respective child node;  
computer readable program code for  
creating a search request that comprises  
names and value ranges from classifiers associated  
45 with the selected node;  
computer readable program code for  
searching the selected Web site for  
products offered for sale that satisfy the search  
request;  
50 computer readable program code for  
retrieving information about each product  
for sale at the selected Web site that satisfies the  
search request, wherein the retrieved information  
comprises at least a name and description of each  
55 product;  
computer readable program code for  
assigning a display priority to the  
retrieved information associated with each product  
that satisfies the search request, wherein a display  
60 priority determines a priority in which information  
about a product is displayed to a user accessing the  
data structure; and  
computer readable program code for storing  
the retrieved information in a computer readable  
65 storage medium with an assigned display priority and  
a link to the selected node.

61. The computer program product  
according to Claim 60 wherein the selected Web site

comprises a search engine and wherein the computer  
readable program code for searching utilizes the  
5 search engine of the Web site.

62. The computer program product  
according to Claim 60 wherein the computer readable  
program code for assigning a display priority to the  
retrieved information comprises:  
5 computer readable program code for  
assigning a first priority to a product  
having a name that satisfies the search request; and  
computer readable program code for  
assigning a second priority that is  
10 different than the first priority to a product  
having a description that contains one or more words  
that satisfy the search request.

63. The computer program product  
according to Claim 60 wherein the selected node is a  
parent node and further comprising:  
computer readable program code for  
5 selecting a child node from the data  
structure stored on the computer readable storage  
medium, wherein the child node is hierarchically  
related to the parent node;  
computer readable program code for  
10 creating a search request that comprises  
names and value ranges from classifiers associated  
with the selected child node;  
computer readable program code for  
searching the selected Web site for  
15 products offered for sale that satisfy the search  
request; and  
computer readable program code for

retrieving information about each product  
for sale at the selected Web site that satisfies the  
20 search request, wherein the retrieved information  
comprises at least a name and a description of each  
product.

64. A computer program product for  
locating products offered for sale at one or more  
Web sites on a computer network, the computer  
program product comprising a computer usable storage  
5 medium having computer readable program code  
embodied in the medium, the computer readable  
program code comprising:

computer readable program code for  
receiving a product search request from a  
10 user;

computer readable program code for  
searching for nodes of a data structure  
that satisfy the received search request, wherein  
the data structure is stored on a computer readable  
15 storage medium and comprises:

at least one parent node that  
represents a category of products offered  
for sale at one or more of the Web sites  
on the computer network;

20 at least one classifier associated  
with each parent node, wherein each  
classifier comprises a name of an  
attribute of a product category and a  
range of values associated with the  
25 respective product category attribute;

at least one child node  
hierarchically related to a parent node,  
wherein each child node represents a sub-

category of products offered for sale at  
30 one or more of the Web sites on the  
computer network; and  
at least one classifier associated  
with each child node, wherein each  
classifier comprises a name of an  
35 attribute of a product sub-category and a  
range of values associated with a product  
sub-category attribute;  
wherein each classifier associated  
with a child node inherits attribute names  
40 and value ranges from classifiers  
associated with a parent node;  
computer readable program code for sending  
results of the search to the user, wherein the  
search results comprise a list of one or more  
45 products offered for sale at one or more of the Web  
sites that satisfy the received user request.

65. The computer program product  
according to Claim 64 wherein the computer readable  
program code for sending search results to the user  
comprises computer readable program code for sending  
5 the search results in a format displayable within a  
user device display.

66. The computer program product  
according to Claim 65 further comprising computer  
readable program code for sending a user-  
manipulatable slider widget to the user with the  
5 search results, wherein the slider widget is  
configured to change the search results displayed  
within a user device display in real time in  
response to user manipulation of the slider widget.

67. The computer program product according to Claim 66 wherein the slider widget is configured to allow a user to change displayed results based upon sales price of products in the list.

68. The computer program product according to Claim 66 wherein the slider widget is configured to allow a user to change displayed results based upon a range of values of an attribute of products in the list.

69. The computer program product according to Claim 64 further comprising computer readable program code for receiving a user request to purchase at least one product within the list.

70. The computer program product according to Claim 69 further comprising computer readable program code for executing a purchase transaction on behalf of the user at one or more of the Web sites in response to receiving the user request to purchase at least one product within the list.

71. A computer program product for purchasing products from multiple Web sites on a computer network, the computer program product comprising a computer usable storage medium having computer readable program code embodied in the medium, the computer readable program code comprising:

computer readable program code for receiving a product purchase request from



10 a user that comprises a request to purchase a first  
product from a first Web site and a second product  
from a second Web site;  
computer readable program code for  
executing a transaction with the first Web  
15 site to purchase the first product on behalf of the  
user and without requiring the user to communicate  
with the first Web site;  
computer readable program code for  
executing a transaction with the second  
20 Web site to purchase the second product on behalf of  
the user and without requiring the user to  
communicate with the second Web site; and  
computer readable program code for sending  
results of the executed transactions with the first  
25 and second Web sites to the user.

72. The computer program product  
according to Claim 71 wherein the first and second  
Web sites each have respective on-line shopping cart  
applications executing thereon, wherein the computer  
5 readable program code for executing a transaction  
with the first Web site to purchase the first  
product comprises computer readable program code for  
providing information about the first  
product and the user to the first Web site shopping  
10 cart application, and wherein the computer readable  
program code for executing a transaction with the  
second Web site to purchase the second product  
comprises computer readable program code for  
providing information about the second product and  
15 the user to the second Web site shopping cart  
application.

73. The computer program product  
according to Claim 71 wherein the computer readable  
program code for sending results of the executed  
transactions with the first and second Web sites to  
5 the user comprises computer readable program code  
for sending the results in a format  
displayable within a user device display.

1/17

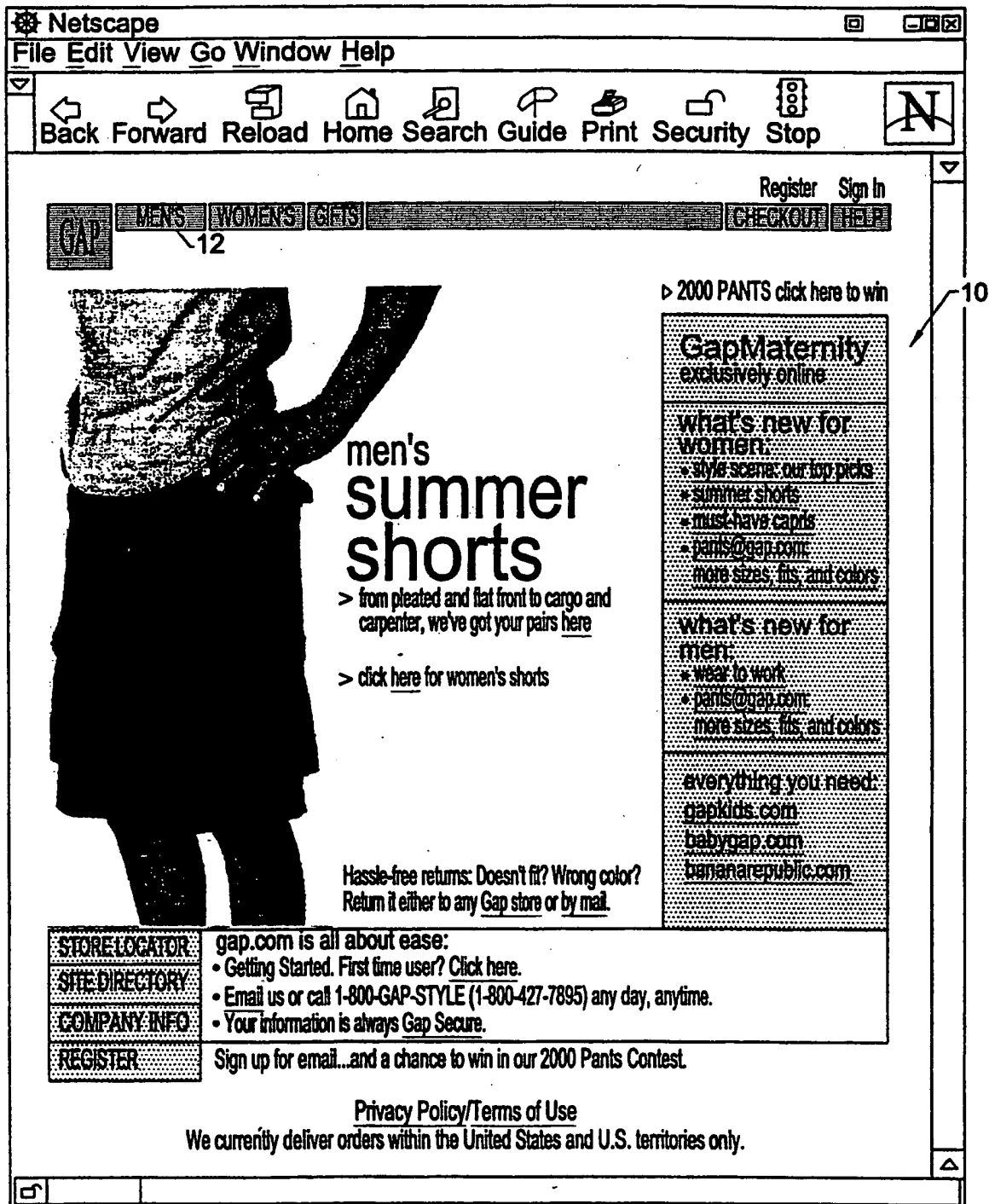


FIG. 1A.

2/17

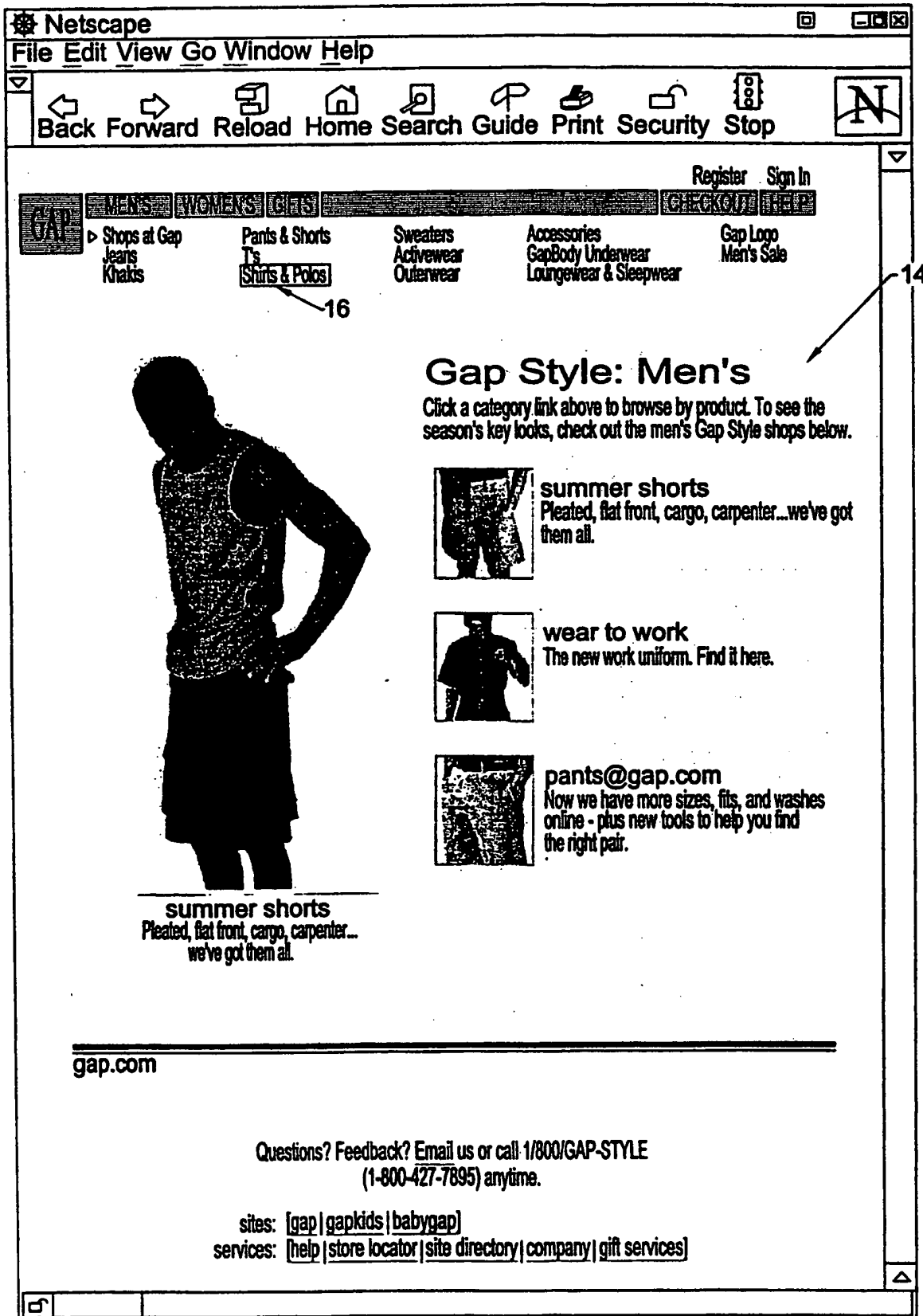


FIG. 1B.

3/17

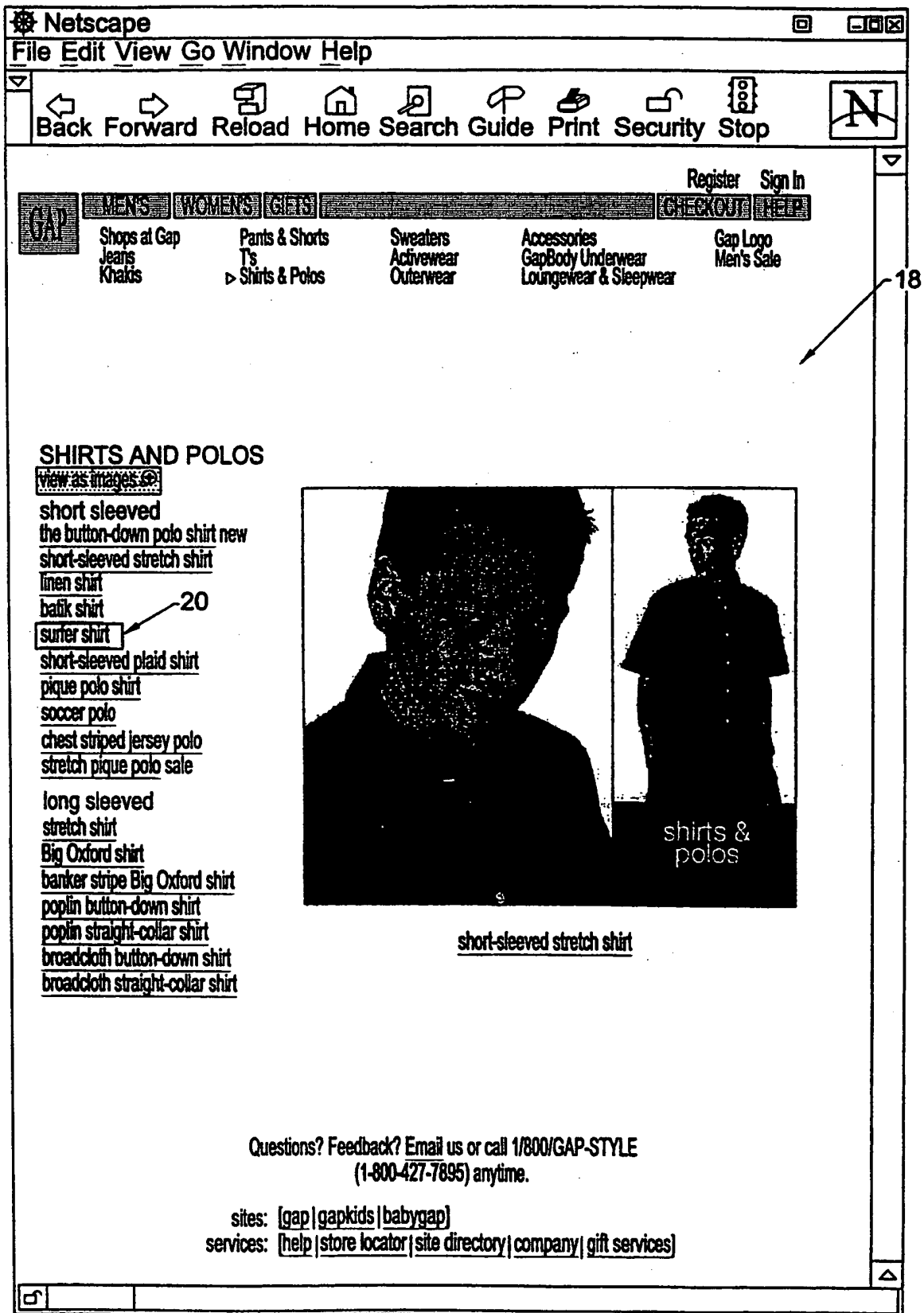


FIG. 1C.

4/17

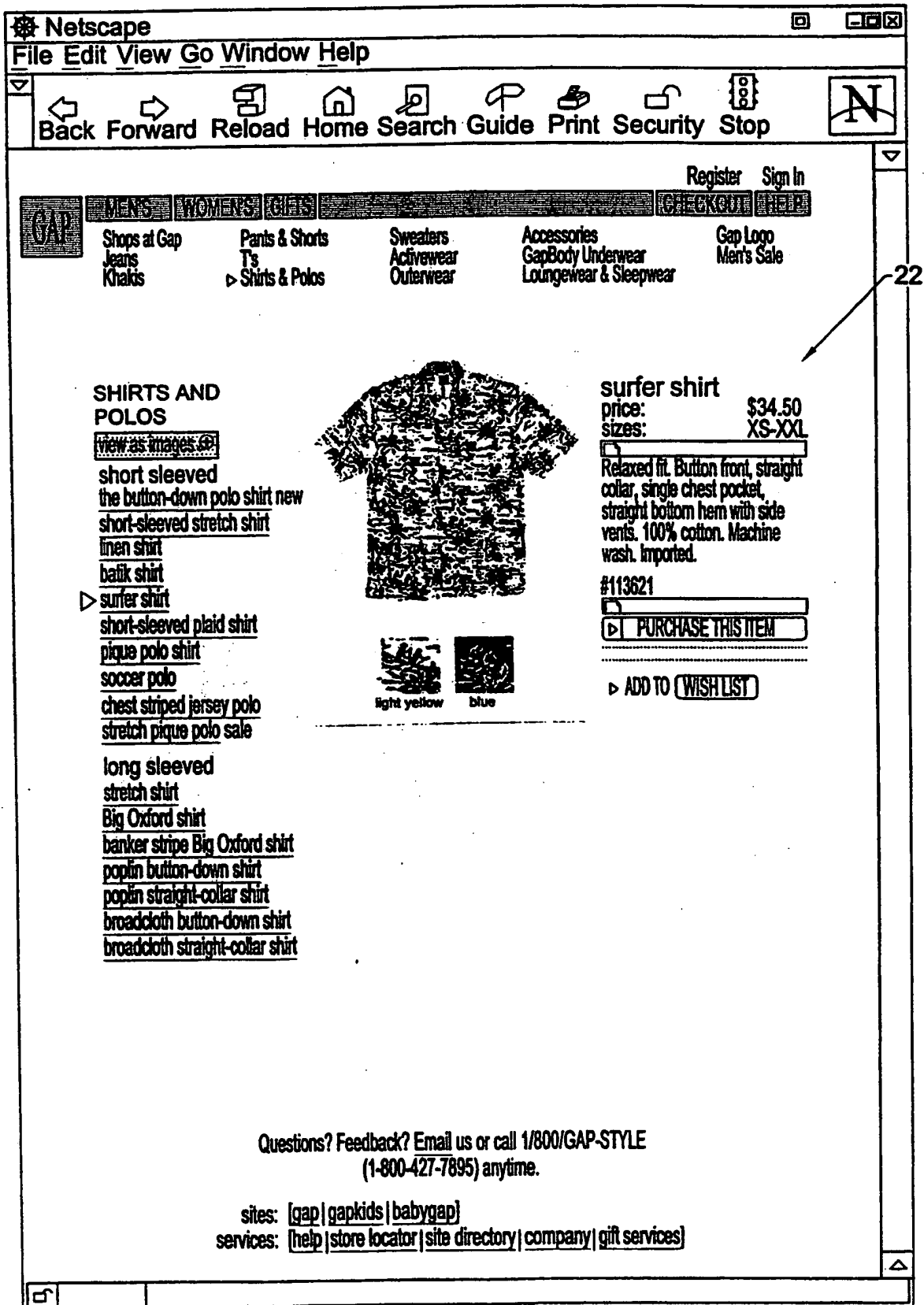


FIG. 1D.

5/17

Netscape  
File Edit View Go Window Help

amazon.com

AUCTIONS ART & COLLECTIBLES ZSHOPS KITCHEN LAWN & PATIO TOOLS & HARDWARE HELP YOUR ACCOUNT

WELCOME BOOKS MUSIC DVD & VIDEO ELECTRONICS SOFTWARE TOYS & VIDEO GAMES HEALTH & BEAUTY HOME LIVING

SEARCH MUSIC BROWSE STYLES CLASSICAL TOP NEW & FUTURE FREE RECOMMENDATION BARGAIN  
MUSIC MUSIC SELLERS RELEASES DOWNLOADS CENTER MUSIC

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Enter search terms in at least one of the fields below and hit "Search Now" when you are ready to search for classical music. You do not need to fill in all fields.

Search Now Clear the Form

Album/Work Title(s):

Composer(s): Beethoven

Performer(s):

Conductor(s):

Orchestra(s)/Ensemble(s): London Symphony

Label Name:

Catalog Number:

Search Now Clear the Form

Search Classical Music

Search Popular Music

Artist, Title, Label

Song Title

Music Search Tips

Search Other Products

Books

DVD & Video

Toys & Games

Electronics & Software

Home Improvement

Kitchen

Lawn & Patio

FIG. 2A.

6/17

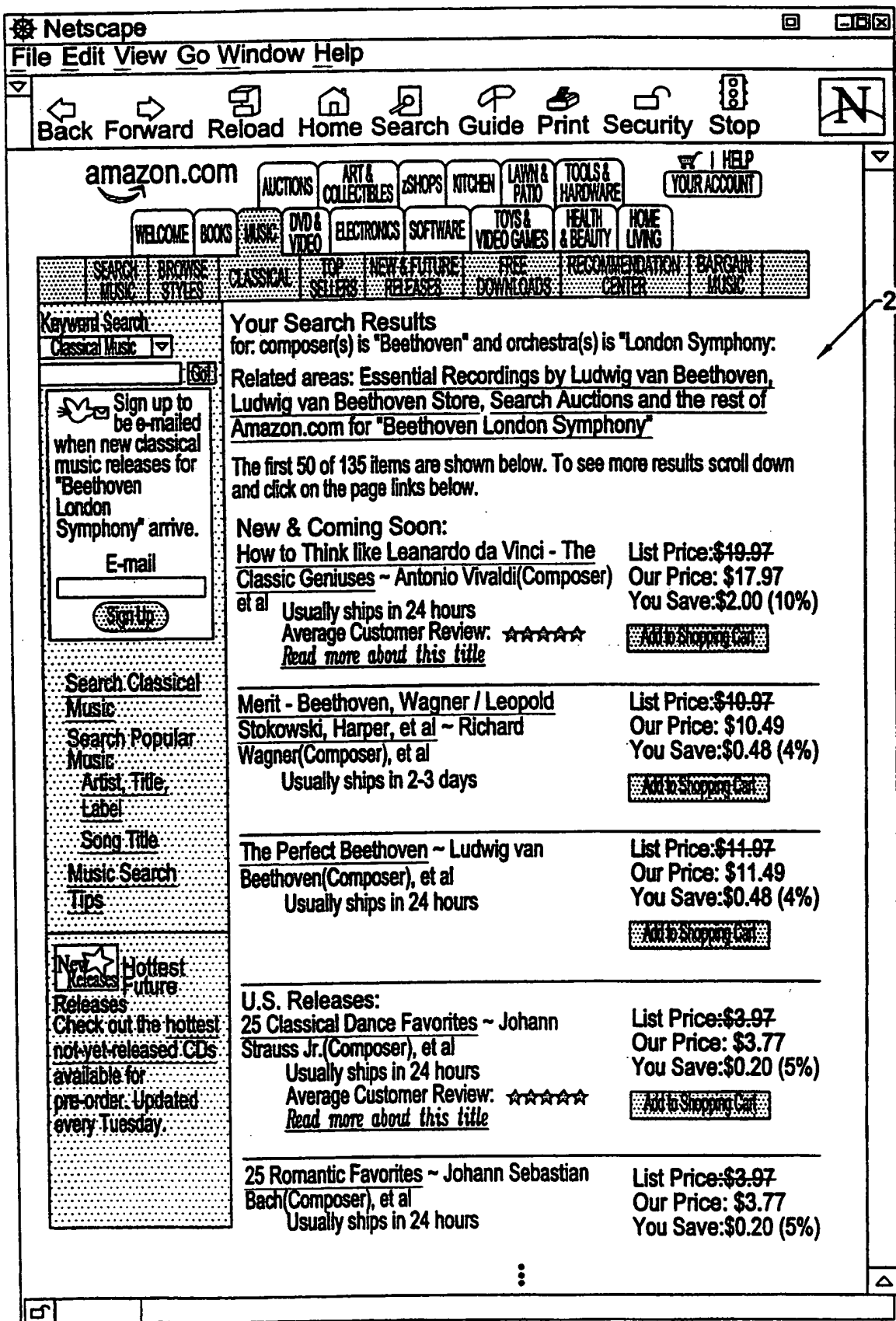
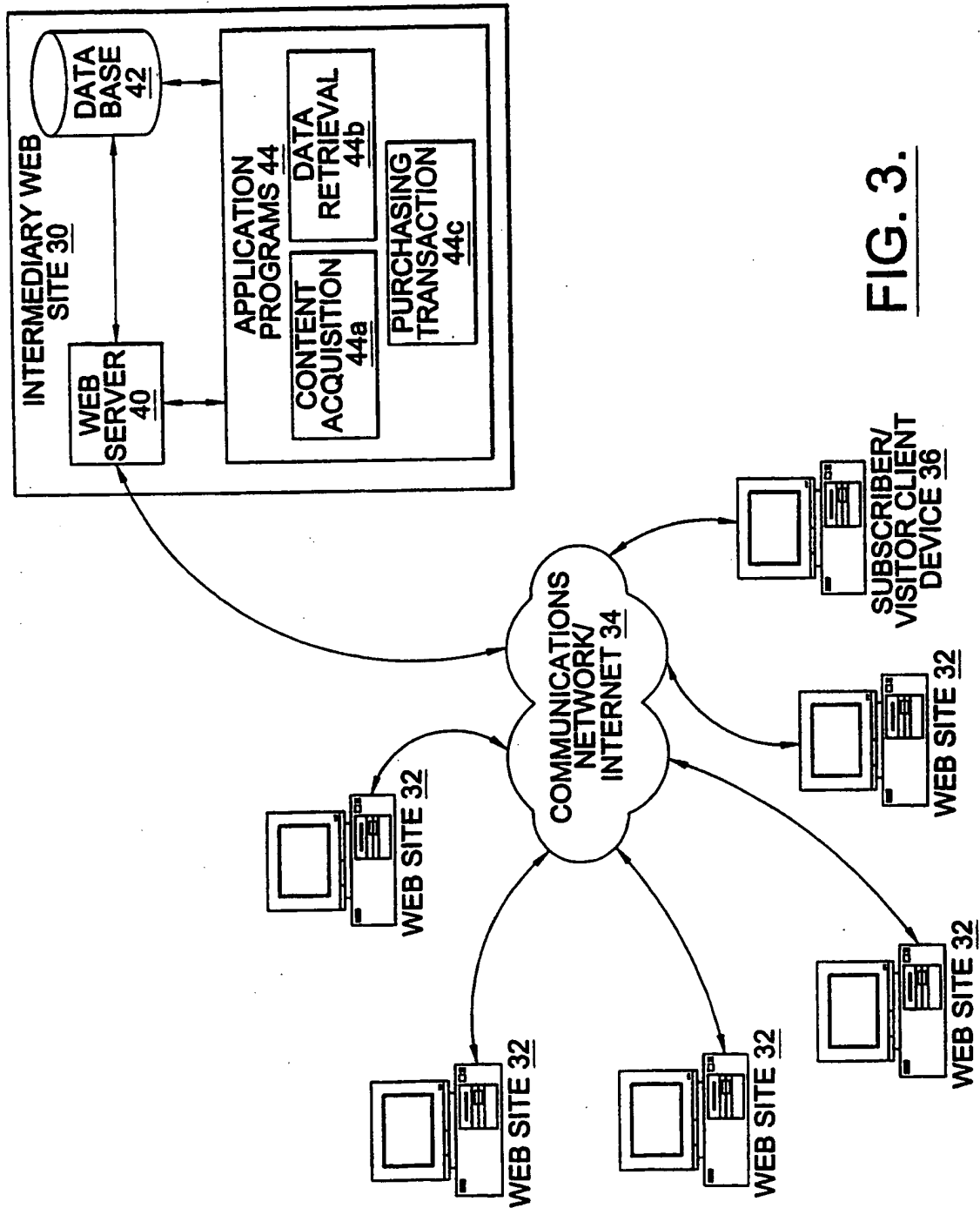


FIG. 2B.



7/17



**FIG. 3.**

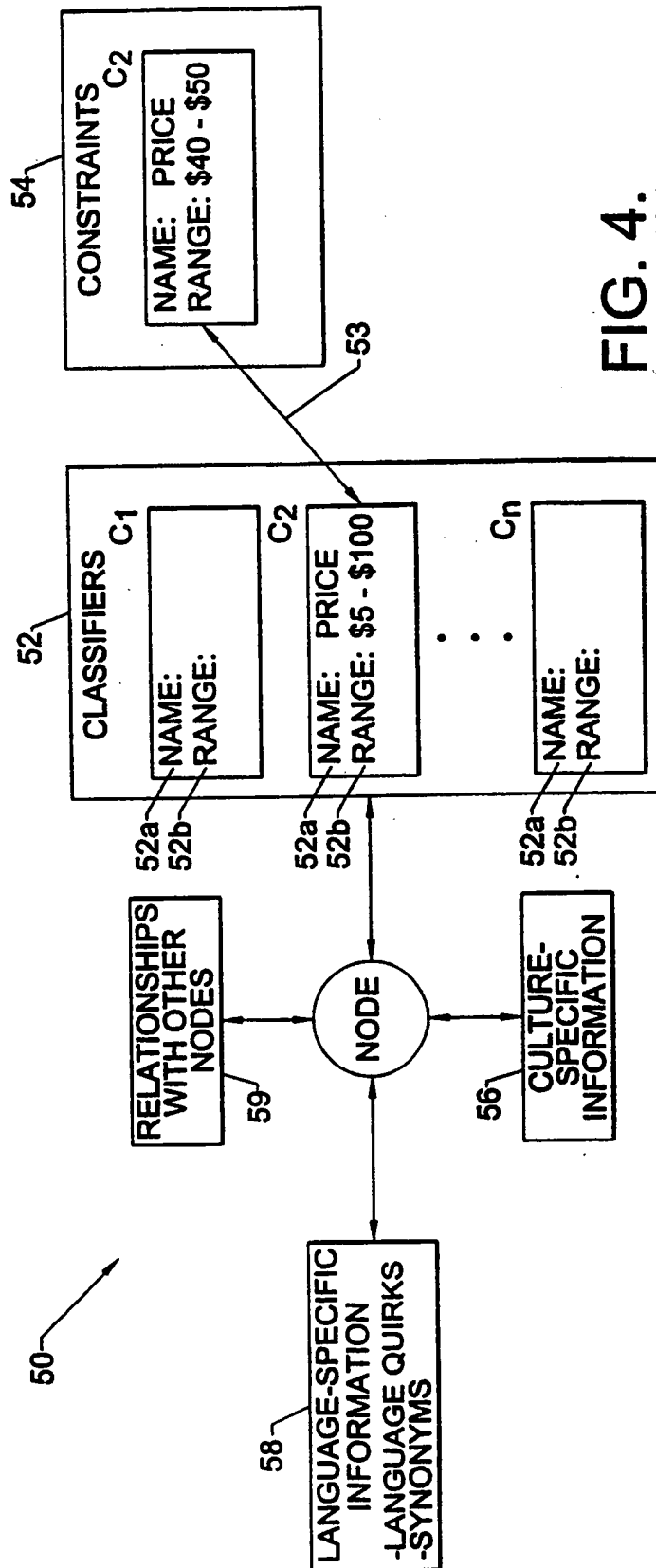
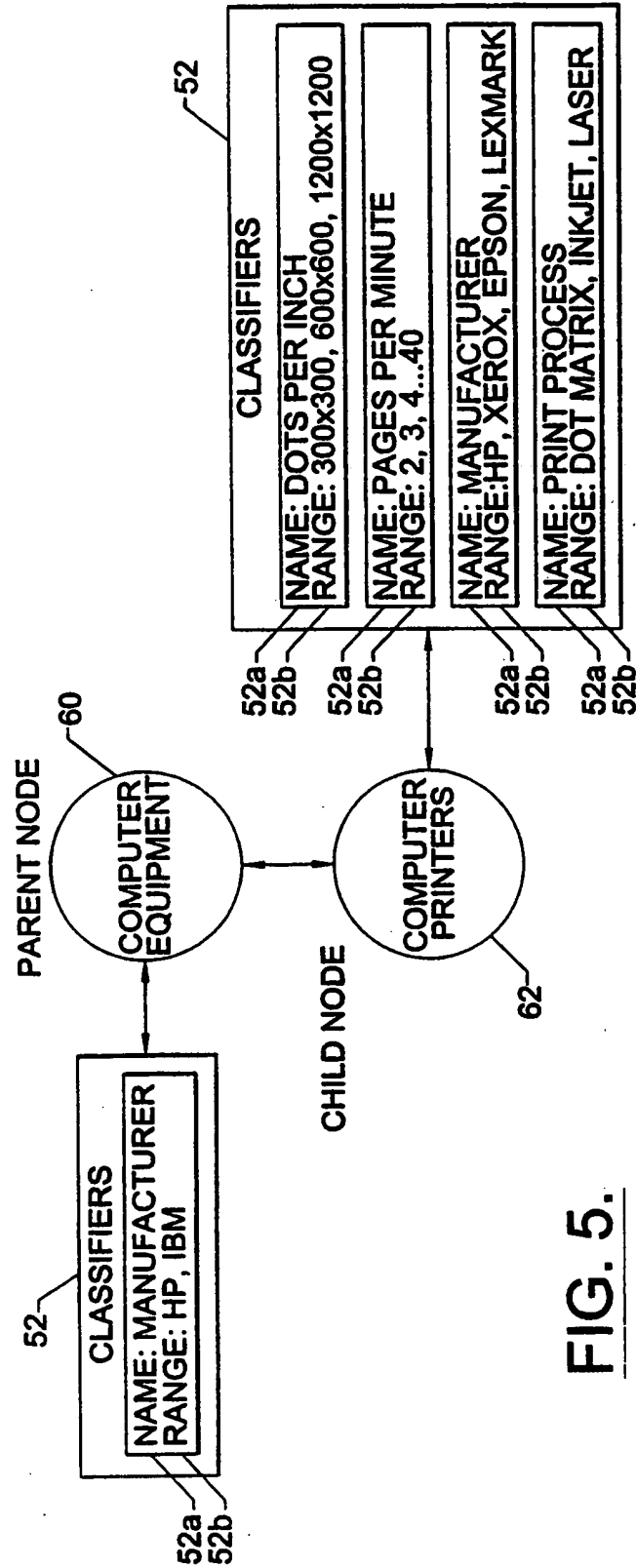
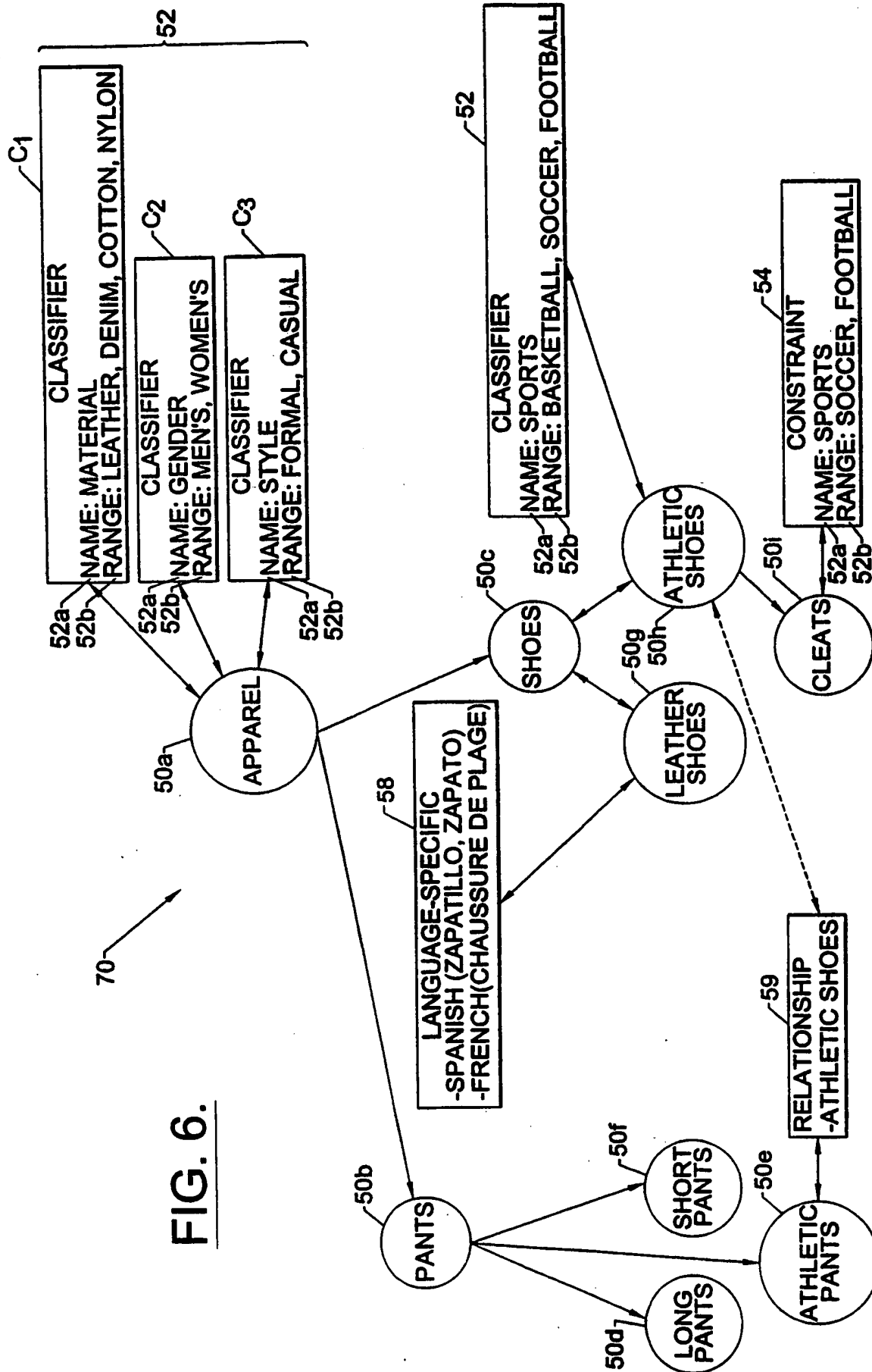


FIG. 4.

9/17



**FIG. 5.**



**FIG. 6.**

11/17

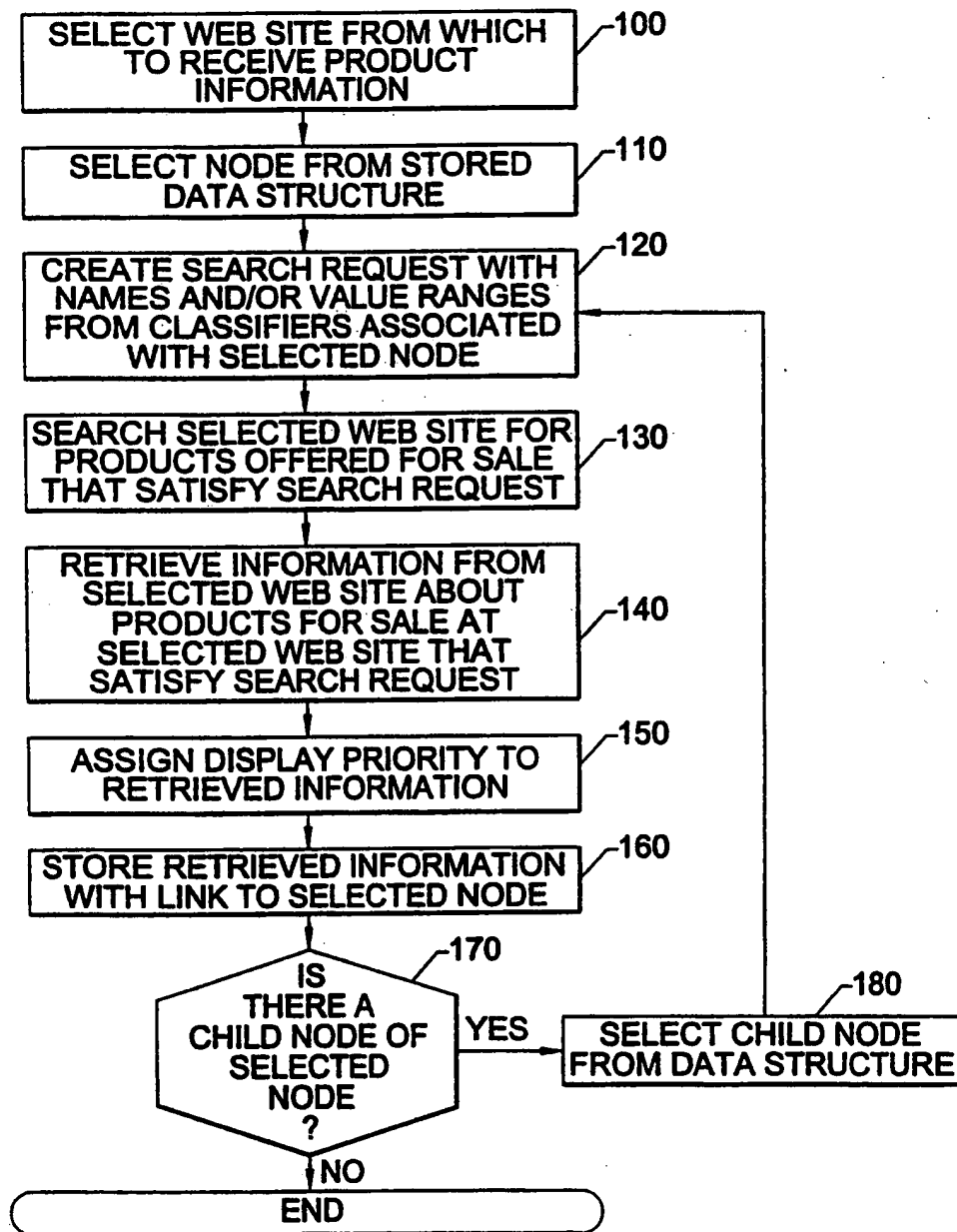


FIG. 7.

12/17

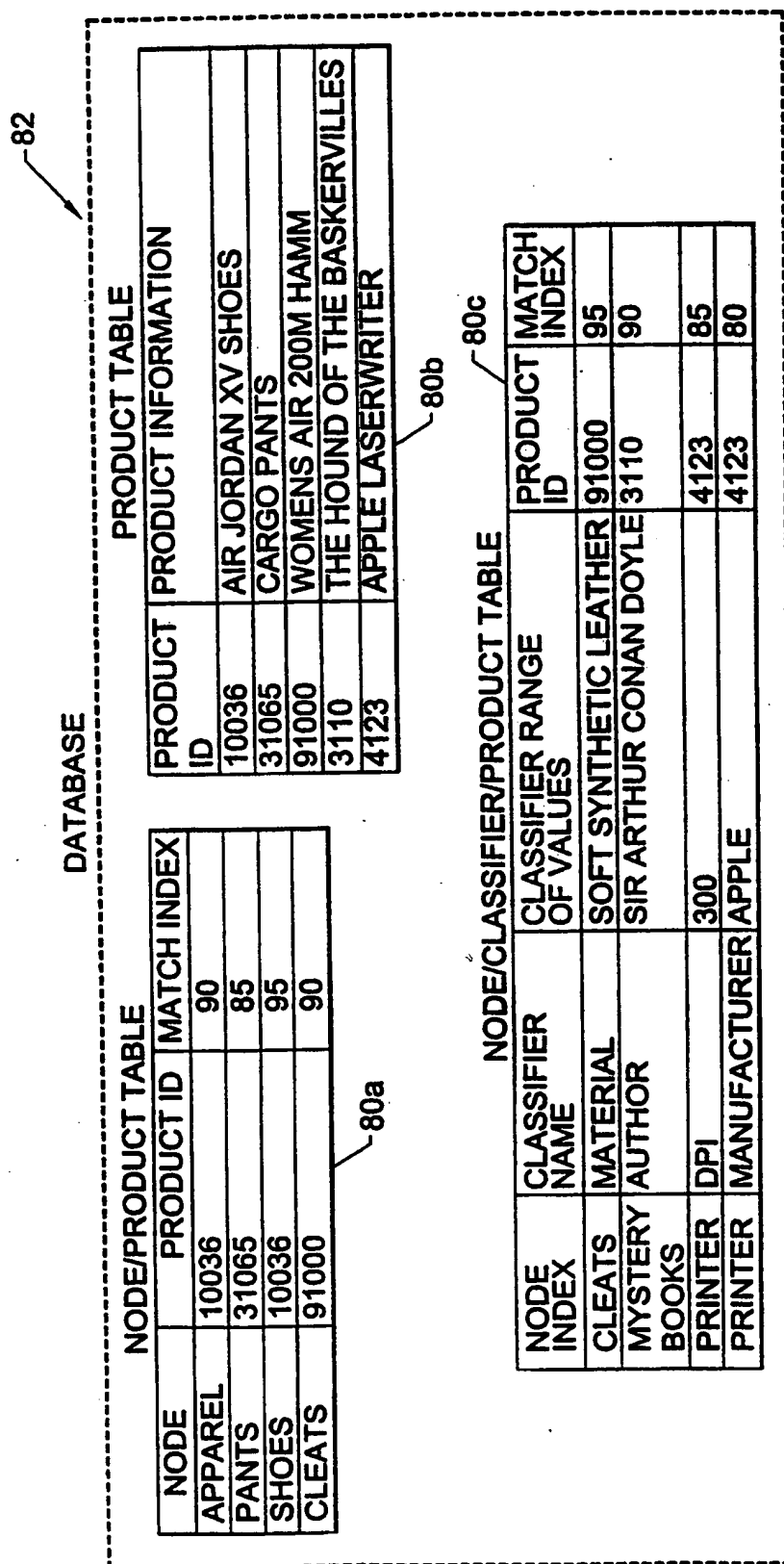
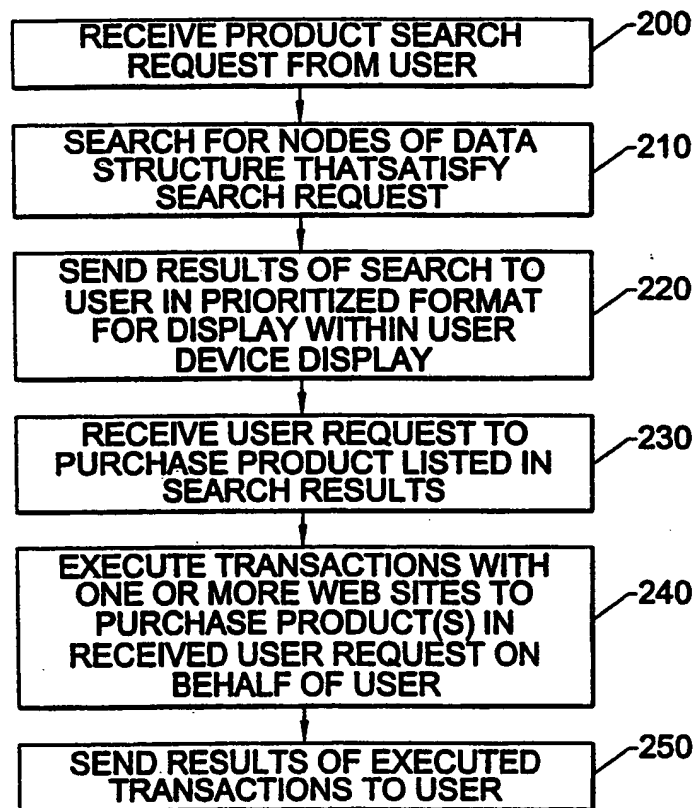


FIG. 8.

13/17

FIG. 9.

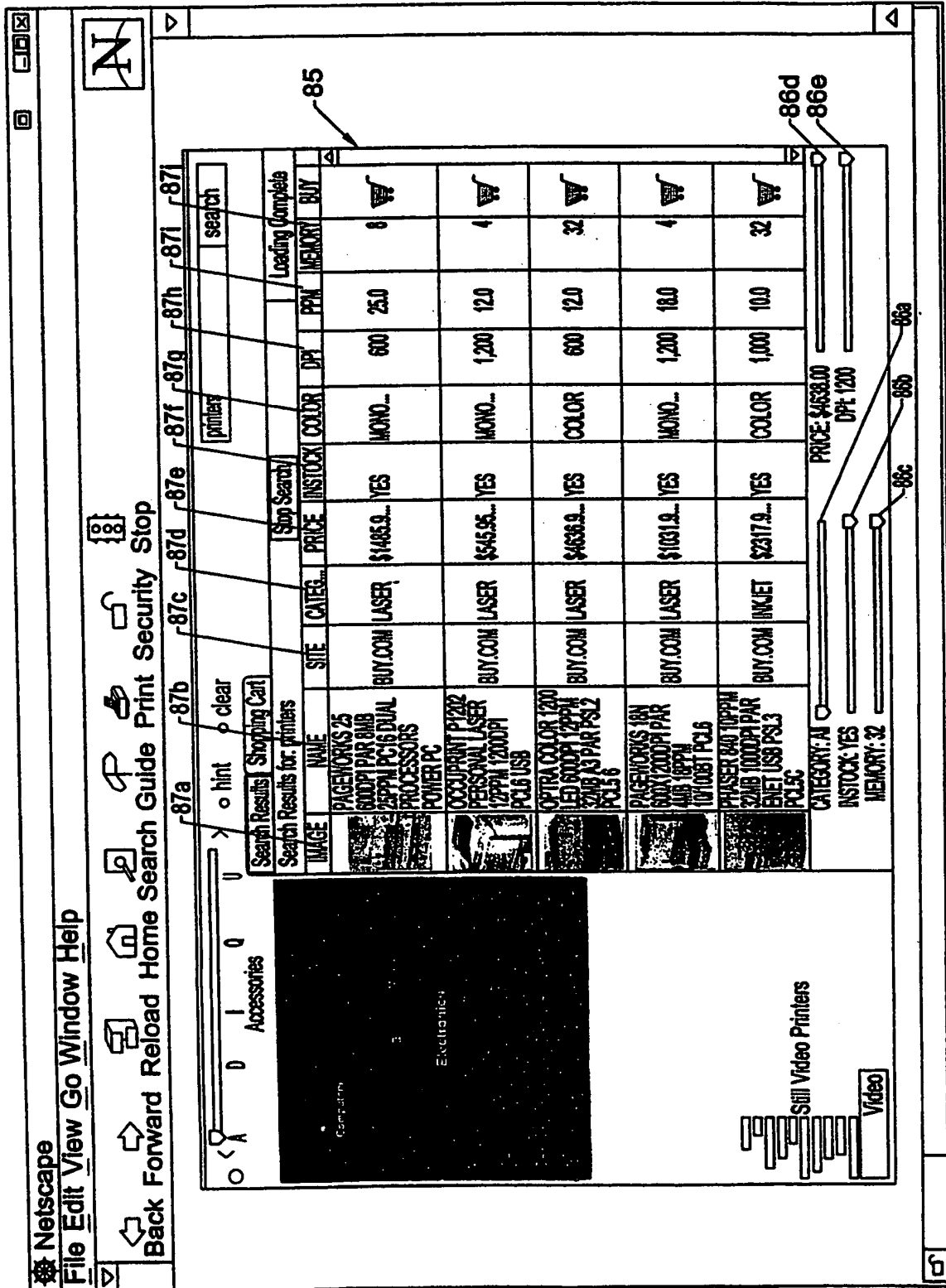


FIG. 10.



15/17

1002

1000

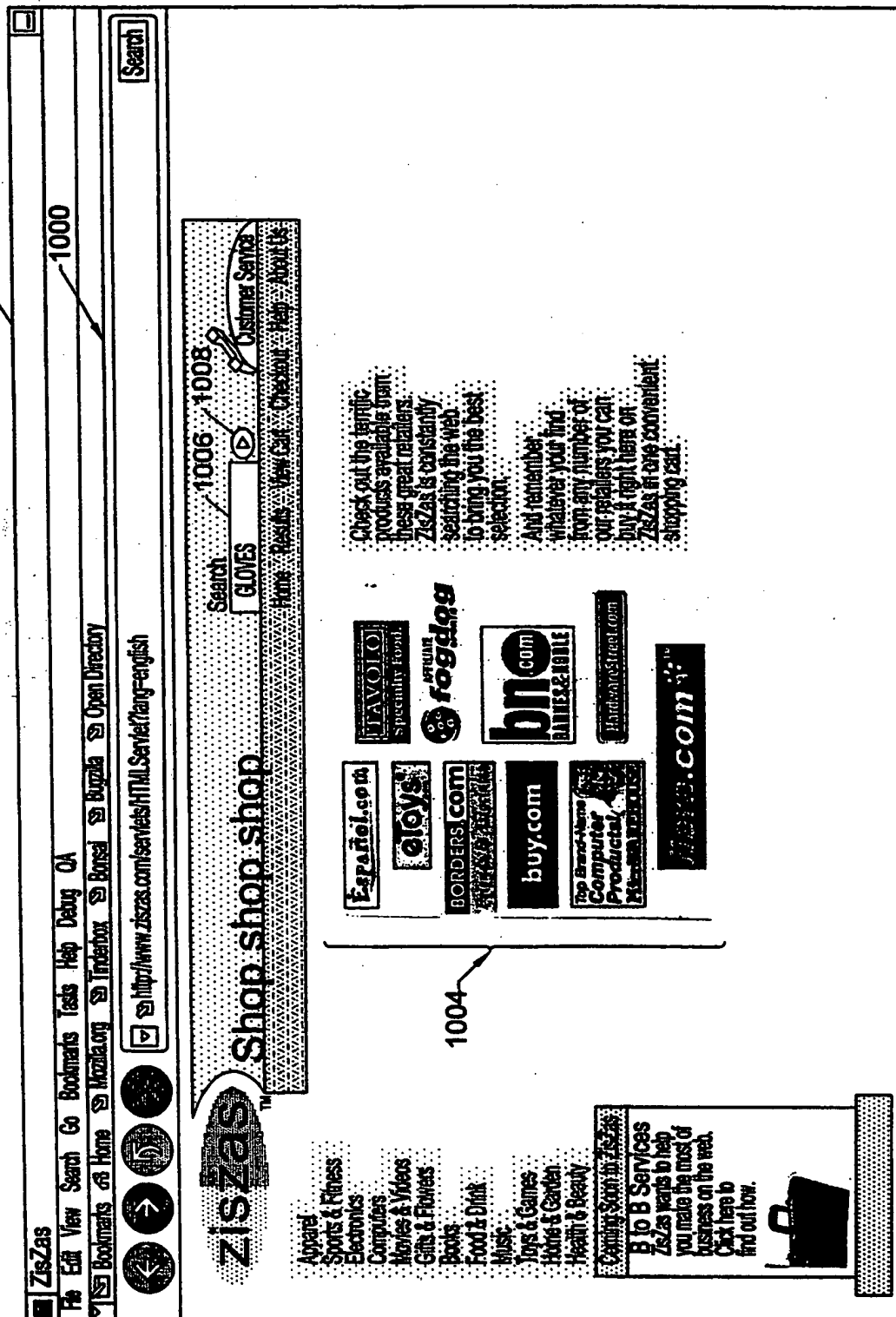


FIG. 11.



17/17

Netescape  
File Edit View Go Window Help

Back Forward Reload Home Search Guide Print Security Stop

Search  5212 Leiden Lane

Apparel  
Sports & Fitness  
Electronics  
Computers  
Movies & Videos  
Gifts & Flowers  
Books  
Food & Drink  
Music  
Toys & Games  
Home & Garden  
Health & Beauty






Your cart contains 3 items!

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Top 5 Purchases

1. TVs
2. Phones
3. CD Players
4. DVD Players
5. GPS Receivers

Please choose the address that you would like to ship these products to. For each merchant, please choose the credit card you prefer to use as well as the merchant's shipping type. After doing this, click on next to finalize your checkout. A receipt will be mailed to you after completion of the transaction.

Picture	Name	Description	Price
	GPS 300	From the company that created the world's first hand-held GPS satellite navigator comes the world's first portable GPS receiver under \$150. The rugged.	\$139.99 Purchase
	Selected a credit card for Fogdog:	Selected a shipping type for Fogdog:	Visa <input type="checkbox"/> 1030 Ground Service (5 to 9 business days) 3.99 1032
	Slim and stylish with more memory!	Selected a credit card for Microwarehouse:	Visa <input type="checkbox"/> 1026 Selected a shipping type for Microwarehouse: UPS GROUND 1030 1032
	Portable DVD Player DVDL50	Copyright © 1998-2000, 800.COM, Inc. All rights.	\$999.95 Purchase
	Selected a credit card for 800:	Selected a shipping type for 800:	Visa <input type="checkbox"/> 1030 UPS Second Day Air 1032 1036

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FIG. 13.

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